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Western Mining in the Twentieth Century Series

KNOXVILLE MINING DISTRICT, THE MCLAUGHLIN GOLD MINE, NORTHERN CALIFORNIA, 1978-2001

Volume VIII

Dean Enderlin	MINE GEOLOGIST, RECLAMATION MANAGER, MCLAUGHLIN MINE
Susan Harrison	MCLAUGHLIN NATURAL RESERVE
Raymond Krauss	ENVIRONMENTAL MANAGER, MCLAUGHLIN MINE

With an Introduction by
Duane Smith

An Interview Conducted by
Eleanor Swent
in 1994, 1996, 2000, and 2001

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1993-1999

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PROLOGUE by Sylvia McLaughlin

This oral history series of the many persons involved with the McLaughlin Mine will be a wonderful resource for historians, sociologists, environmentalists, and the mining industry. In this sense, Eleanor Swent's interviews have been and will be a valuable public service for which we all are grateful.

I drove my husband, Don McLaughlin, up to the mine site several times when it was still considered a project. The road then from Lower Lake was a rather narrow, dirt road which became quite slithery with mud during the rainy season.

Don was very enthusiastic about the plans for developing a mine there and, of course, he was so pleased that it was named for him. He died just a few months before the dedication of the mine. I'm sure he would be very gratified that the mine produced the expected amount of ore and that the site was left in as environmentally benign a way as possible.

With Don's interest in education and in the University of California and with my interest in the environment, creation of the Donald and Sylvia McLaughlin Reserve is a wonderful new use for this extensive mining property. It is so good to know that the Homestake Mining Company, by an agreement with the University of California involving a large acreage of the McLaughlin Mine, will provide an ideal area for students of the Davis campus to do many kinds of scientific research. This special, natural reserve will also provide inspiration for students to do creative work in the humanities. I hope this educational use of a former gold mine property can be a model for other mining and industrial sites.

We all can be very proud of the ongoing legacy of the McLaughlin Mine and of its history which is so well described in this series of oral histories.

August 2001
Berkeley, California

Sylvia McLaughlin and Ray Krauss, April 24, 1999.

INTRODUCTION TO KNOXVILLE/McLAUGHLIN PROJECT by Duane A. Smith

Imagine, if you would, what it would be like to have a series of interviews from people of all walks of life from a nineteenth century mining town and district--for example, a Fiddletown, California; a Silver City, Idaho; or a Caribou, Colorado. Would it not be exciting to "hear" first hand the stories of miners, store owners, lawyers, teachers, and a variety of other folks that make up the mining West?

Such a series of interviews would be the perfect answer to the Roman statesman, orator, and philosopher, Marcus Tullius Cicero, who observed more than 2,000 years ago: "History is the witness that testifies to the passing of time; it illuminates reality, vitalizes memory, provides guidance in daily life, and brings us tidings of antiquity." Imagine, then, what the Knoxville/McLaughlin oral history project is going to mean to future generations.

The Knoxville, California, mining district has a long mining history. It started in the 1860s with mercury mining and continued into the 1990s with Homestake Mining Company's McLaughlin gold mine. Under the guidance of Eleanor Swent, and as part of the Regional Oral History Office's Western Mining in the Twentieth Century series, a comprehensive oral history project of this mining district was launched in 1993. These fascinating and significant volumes are the finished projects.

While obviously impossible to go back beyond the turn of the century, interviews were conducted with miners, ranchers, journalists, teachers, and merchants who were in the district before the arrival of Homestake. The words of these people provide an exciting look at a district in transition and decline. Then came Homestake and their world changed.

Some gold mines had been operated here in the nineteenth and twentieth centuries, but they were nothing like what occurred when a major mining company became interested. Homestake's geologists found enough gold to warrant development. The concept would be an open pit mine and mill that would impact Napa, Lake, and Yolo Counties in northern California for a generation and provide for the future.

Five and one-half years went into planning for the McLaughlin gold mine, including 327 approvals needed for the mine's development. Not only were some mining ideas new and ground breaking, but the operation was sitting in one of the most environmentally aware states in the country. Homestake spent over $283 million in start-up costs, before mining commenced in March 1985. The first year's production of 83,836 ounces of gold showed that the planning and work had been worthwhile from a dollars-and-cents aspect. Homestake was proud of its operation. "The McLaughlin mine is the site of the first successful commercial application of the autoclave processing technology for extracting gold from ores. The operation began production in 1985 and is a showcase for environmental responsibility."

Homestake would continue to mine the pit into 1996 when mining ceased, except for processing previously stockpiled lower-grade ore to be worked for approximately another eight years, "using a conventional direct cyanide leach process." Reclamation, which has been conducted simultaneously with mining, would also continue into the next century. As Homestake's annual report in 1995 stated, "Reclamation of mine waste dumps is scheduled for completion in the latter part of 1996 with the final placement of top soil and hydroseeding. The planting of oak trees and other indigenous vegetation will continue seasonally until the area is completely reclaimed."

All this makes the oral history project that much more exciting; it was conducted while the district still operated and memories were fresh and riveted on a host of topics and concerns. This multi-volume series covers almost every conceivable aspect and impact--it is a monument to a refreshing, innovative way of approaching mining history.

These volumes provide a case study of twentieth century mining, environmental issues, and regional concerns, the successes, failures, tensions, and developments that go to make up a 1980s and 1990s mining operation and the people involved from all walks of life. They are a gold mine of primary documentation and personal memories of an era that is passing into history. A perusal of the table of contents will give the reader an idea, but the interviews need to be "assayed" carefully to grasp the whole story of what went on at the McLaughlin mine and why its impact was so significant. This is a "high grade" effort all the way.

Cicero would be proud. These volumes do illuminate reality, vitalize memory, and provide guidance in daily life. Without question, they testify to the passing of time and will eventually bring "us the tidings of antiquity."

Duane A. Smith
Professor of History and
Southwest Studies

September 1997
Fort Lewis College
Durango, Colorado

PROJECT HISTORY--Knoxville District/McLaughlin Mine Oral History Project

The development of the McLaughlin gold mine in the Knoxville District of Napa, Lake, and Yolo Counties in California in the last quarter of the twentieth century was a historically significant event. The mines of the district had been major producers of mercury since 1861. In 1888 an official report by G. F. Becker on the quicksilver deposits mentioned the presence of free gold which could be obtained by panning. It took almost a century before this knowledge could be acted upon when Homestake Mining Company signed an agreement with James William Wilder, owner of the Manhattan Mine, in 1978.

Advisors to the oral history series on Western Mining in the Twentieth Century[1] who were also Homestake directors, Professor Douglas Fuerstenau, principal faculty advisor, Clifford Heimbucher, and John Kiely, all urged the Knoxville/McLaughlin oral history project, as did advisor Sylvia McLaughlin, widow of the Homestake chairman for whom the mine was named. It was decided it should be a community oral history, in contrast to the previous volumes in the series which documented individual careers.

The five historically important aspects are: the history of the Knoxville mercury mining district, with its periodic booms and busts; the effects of a large industrial development and influx of technically trained workers in an economically depressed rural area; the efforts to obtain permits to develop a mine near a center of environmental activism; the continuous pressure oxidation system which was pioneered at the McLaughlin processing plant; the reclamation of the mine site. The life of the McLaughlin mine was projected to be about twenty years, and most of the key players were available for interviews. It is a nearly unique opportunity to document the discovery, development, and closing down of a mine while it is happening.

The history of the Knoxville District begins in 1861 with the incorporation of the Redington quicksilver mine, also known as the XLCR or Knoxville mine, then employing as many as 300 men. The town of Knoxville had thirty or more buildings, including a store, hotel, postoffice, Wells Fargo office, school, and cemetery. In 1872 the state legislature transferred prosperous Knoxville Township from Lake County to Napa County, although it is separated from the Napa Valley by mountain escarpments. Lake County was compensated with a one-time payment of $3500.

In 1869 Richard Knox and Joseph Osborne opened the Manhattan Mine on the same lode as the Redington. The Oat Hill or Napa Consolidated

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[1] Information on the Western Mining in the Twentieth Century oral history series appears in the Appendix, page 543.

Mine was opened in 1872. A report on the metallurgy of quicksilver issued by the Department of the Interior in 1925 says, "In 1874, the Knox continuous shaft-furnace for the treatment of both fine and coarse ores was first used in California." [Bulletin 222, p. 5]

The Knox-Osborne design was further augmented by a fine-ore natural-draft furnace developed by mine superintendent Charles Livermore. The district prospered until 1905, for a decade around World War I, and from 1927-1936. Demand for mercury rose during wartime because it was used as a detonator for explosives.

Knoxville was linked by road through Sulphur Canyon with the town of Monticello in fertile Berryessa Valley. Farmers descended from early Scots settlers grew pears, prunes, wheat, and barley and occasionally worked in the mercury mines. After World War II, when California's population was growing rapidly, a dam was built which by 1956 flooded the valley to create Lake Berryessa. It attracted vacationers, and for most of them it was the end of the line. The unpaved road from Lake Berryessa to Knoxville was impassable when rains filled the creek bed. In the other direction, from Knoxville to Clearlake, there was a similar little-used road through Morgan Valley.

Although it is only a few miles from the densely populated San Francisco Bay Area, in 1978 Knoxville township had few telephones, surfaced roads, or bridges. Populated by ranchers, miners, seasonal hunters, and outlaws, it was one of the most economically depressed regions in California, with high unemployment. In 1991, Napa historian Robert McKenzie called it "truly the last frontier of Napa County."

The chronology of the McLaughlin Mine is as follows: in 1961, following publication of a Professional Paper by USGS geologist Ralph J. Roberts, Newmont geologists John S. Livermore and J. Alan Coope found a major deposit of micron-sized gold on the Carlin trend in Nevada. It was economic to mine because of technological advances in explosives and earth-moving equipment, and development of new methods such as heap-leaching for recovery of gold from ore. This led other mining companies to search for similar deposits of "invisible" gold.

In 1969, the National Environmental Protection Act was passed, followed in 1970 by the California Environmental Quality Act.

In the 1970s, "Bill" Wilder, principal of the One Shot Mining Company, was reclaiming batteries for Mallory Company in the furnaces at the Manhattan mercury mine. Environmental concerns had made mercury mining unprofitable, so Wilder was crushing the beautiful colored rock on his property and selling it as decorative stone. An assay from several years before had showed gold was there, but at that time mercury at $75 a flask was more valuable than gold at $35 an ounce, the official price from January 1934, when the United States went off the gold standard, until 15 March 1968.

In August 1971, President Richard Nixon terminated the convertibility of the dollar into gold, and the price climbed to $800 an ounce in 1980. In 1977, Homestake Mining Company underwent a restructuring and embarked on a program to find a world-class gold mine. Their search revealed geology reports in their files from the 1920s which encouraged exploration at hot springs near the Knoxville mercury mining district of northern California. In 1978 Donald Gustafson, Homestake geologist, visited the Manhattan Mine at the place where Napa, Yolo, and Lake Counties meet. A drilling program revealed an epithermal gold deposit which at this juncture remains unique; no extension or replica has been found in the Great Valley geologic sequence or the Coast Range thrust which were exposed at McLaughlin.

Mining companies are familiar with developing mines in remote and rugged locations, with the attendant logistical problems. In this case, there was the further challenge of obtaining permits to develop a mine in the jurisdiction of three counties, regional and state water quality districts, three regional air quality districts, various state agencies, and the Bureau of Land Management. It took more than five years and cost millions of dollars to secure the 327 required permits which made a stack of paper more than eight feet high. In addition, the ore itself was finely disseminated, fairly low grade, and as it turned out, highly refractory. Traditional methods of beneficiation were ruled out by environmental concerns, so Homestake metallurgists developed a high pressure oxidation system, incorporating technology from South Africa, Germany, Canada, and Finland, which has now been widely copied.

The eventual design was for a mine pit with adjacent crushing plant and a five-mile pipeline to conduct slurry to a zero-discharge processing plant using a variety of technologies, including autoclaves. Reclamation in the mine and on dumps began almost immediately, and at the end of the mine's life, it is a research facility, named the Donald and Sylvia McLaughlin Natural Reserve, part of the Natural Reserve System of the University of California, administered at the Davis campus.

In 1991, the Regional Oral History Office began to explore possibilities for funding the Knoxville/McLaughlin oral history. A four-year project was outlined to include about thirty-five interviews averaging three hours each, for a total cost of $100,000, resulting in a set of volumes covering the mercury mining, the gold mining, and the resulting changes in the surrounding community. The Hearst Foundation granted $20,000 to document the gold mine, and the Mining and Metallurgical Society of America gave $6,000 to document the earlier mercury mining. Homestake and Chemical Lime Company each donated $2,000, which enabled interviewing to begin in March, 1993.

The best laid plans, however, can be changed by circumstances beyond control. One of the first names on the list of interviewees was John Ransone, Homestake's construction project director. He sent helpful background documents in preparation for a scheduled interview; however, before it could be held he died of lung cancer. The project manager for the construction company, Klaus Thiel, in the meantime had been assigned to work in Brisbane, Australia, so he could not be interviewed. Some of the Homestake staff had scattered: James Anderson to Denver, Jack Thompson and John Turney to British Columbia, David Crouch to Salt Lake City, Donald Gustafson to jobs in Namibia and Kazakhstan, Joseph Strapko to Maine. William Humphrey and Richard Stoehr both underwent major surgery. Nevertheless, interviews were conducted with these and most of the other key figures in the development, operation, and reclamation of the mine.

Although similar difficulties occurred on the list of community leaders, by 1996 interviews had been conducted with a county supervisor from each of the three counties involved in the permitting process, as well as Napa County planners, the Lake County school superintendent, the director of the Solano Irrigation District, community historians and pioneers, merchants, and ranchers. Some of the most vocal opponents of the mine, most of them from the Capay Valley in Yolo County, were also interviewed.

There is a perception that the former mercury miners are all dead, killed by mercury poisoning. In fact, Dean Enderlin, a geologist at the McLaughlin Mine and also a Napa County native and historian, helped to locate some who were remarkably healthy, and who were interviewed. Elmer Enderlin in his eighties spends summers working at his tungsten prospect in Idaho and winters in Lower Lake. Anthony Cerar, also in his eighties, at the time of interviewing still actively maintained several historic mercury mines, including La Joya and Corona. Hugh C. Ingle, now deceased, was working energetically at mines in Nevada and at the Corona when he was interviewed. William Kritikos, operator of the Oat Hill Mine, was nearly seventy-three when he died following a stroke, but was in good health at the time of his interview. Ed McGinnis, who worked around the Reed Mine as a boy, is still active in his seventies. Bill Wilder, who owned the Manhattan Mine, is a relative youngster in his seventies and in good health in Upper Lake.

In December 2000, Professor Susan Harrison of the University of California at Davis was interviewed as Director of the Donald and Sylvia McLaughlin Natural Reserve, and spoke to the value of the mine site and surrounding area for the study of serpentine ecology. The final interview with environmental manager Raymond Krauss in July 2001 told of the fruition of his vision of including the mine in the Blue Ridge-Berryessa Natural Area.

The project as it is completed after ten years comprises forty-seven interviews in all. Four major interviews were bound individually as separate volumes: William A. Humphrey, *Mining Operations and Engineering Executive for Anaconda, Newmont, Homestake, 1950-1995*; Hugh C. Ingle, Jr., *Independent Small Mines Operator, 1948 to 1999; Corona*

Mine; Patrick Purtell, *Maintenance and Management at the McLaughlin Mine, 1985 to 1997*; and James William Wilder, *Owner of One Shot Mining Company and Manhattan Mercury Mine, 1965-1981*. The other forty-three oral histories, arranged in alphabetical order, are bound into eight volumes. Appropriate supplementary documents are included in each volume. It is expected that researchers will refer to the entire set for a comprehensive account of the Knoxville District/McLaughlin Mine. Additional associated materials are also deposited in the mining collection at The Bancroft Library, and may be consulted for research. They are listed in the appendix to this volume.

We are grateful above all to the interviewees for their participation. Many others have helped as well. Homestake Mining Company has supported the project not only with funds, but also in lending the Regional Oral History Office a computer and printer, and making available for research the archival video tapes and files of newspaper clippings and news releases, as well as the environmental studies, the environmental impact report, and the environmental impact statement. Early on, a day tour of the property and box lunch were provided for a van load of ROHO staff, interested students, and faculty from the University of California at Berkeley. The conference room at the mine and the San Francisco offices at 650 California Street have been used for interviewing.

Professor Duane Smith, mining historian at Ft. Lewis College, Durango, Colorado, wrote an introduction for the Knoxville/McLaughlin Mine oral history project. Professor Greg Wheeler of Sacramento State University has given advice, and staff members of the California Division of Mines and Geology Les Youngs, Ron Churchill, and Kathleen Twomey provided photos and graphs. Anthony Cerar led a vigorous hike around the Knoxville mine site, identifying foundations of long-gone buildings and workings. Mrs. George F. Clark donated photographs taken by her husband in 1983-1985. Dean Enderlin advised on local history and provided supplementary documents. James Jensen made available his extensive files on mercury mining and processing and mercury poisoning. Andrew Johnston gave valuable instruction in the history and technology of mercury mining in this district and others. John Livermore conducted a tour by jeep of the Knoxville district, and suggested the importance of the Morgan North papers at The Bancroft Library. Staff members gave help at the Napa *Register*, the Napa Museum, the Sharpsteen Museum in Calistoga, and the Lake County Museums in Lower Lake and Lakeport.

In March and May 2002, Suzanne Riess, Senior Editor, and Kathryn Marks, Editor, of the Regional Oral History Office, filmed a video at the McLaughlin Mine, showing Raymond Krauss and Patrick Purtell demonstrating the topographic and mine models, Dean Enderlin discussing the geology, and Susan Harrison discussing the McLaughlin Mine as part of the UC Natural Reserve system. The video will be preserved at The Bancroft Library.

In December 2001, Homestake Mining Company was acquired by Barrick Gold Corporation of Canada. A few of the McLaughlin employees will move to Barrick operations; most of them are choosing to stay in the Lake County area, where they are at home.

The tapes of all the interviews are available for study at The Bancroft Library. The completed volumes are available at The Bancroft Library and in the Special Collections at UCLA.

Eleanor Swent, Project Director
Knoxville District/McLaughlin Mine
Oral History Project

May 2002
Regional Oral History Office
The Bancroft Library
University of California, Berkeley

Knoxville District/McLaughlin Mine Oral History Project

William Humphrey, *Mining Operations and Engineering Executive for Anaconda, Newmont, Homestake, 1950 to 1995*, 1996

Hugh C. Ingle, Jr., *Independent Small Mines Operator, 1948 to 1999; Corona Mine*, 2000

Patrick Purtell, *Maintenance and Management at the McLaughlin Mine, 1985 to 1997*, 1999

William Wilder, *Owner of One Shot Mining Company: Manhattan Mercury Mine, 1965-1981*, 1996

The Knoxville Mining District, The McLaughlin Gold Mine, Northern California, Volume I, 1998
- Anderson, James, "Homestake Vice President-Exploration"
- Baker, Will, "Citizen Activist, Yolo County"
- Birdsey, Norman, "Metallurgical Technician, McLaughlin Process Plant"
- Bledsoe, Brice, "Director, Solano Irrigation District"

The Knoxville Mining District, The McLaughlin Gold Mine, Northern California, Volume II, 1998
- Cerar, Anthony, "Mercury Miner, 1935-1995"
- Ceteras, John, "Organic Farmer, Yolo County"
- Conger, Harry, "President, Chairman, and CEO, Homestake Mining Company, 1977 to 1994"
- Corley, John Jay, "Chairman, Napa County Planning Commission, 1981 to 1985"
- Cornelison, William, "Superintendent of Schools, Lake County" (Includes an interview with John A. Drummond, Lake County Schools Attorney)

The Knoxville Mining District, The McLaughlin Gold Mine, Northern California, Volume III, 1998
- Crouch, David, "Homestake Corporate Manager-Environmental Affairs"
- Enderlin, Elmer, "Miner in Fifty-Eight Mines"
- Fuller, Claire, "Fuller's Superette Market, Lower Lake"
- Goldstein, Dennis, "Homestake Corporate Lawyer"
- Guinivere, Rex, "Homestake Vice President-Engineering"

The Knoxville Mining District, The McLaughlin Gold Mine, Northern California, Volume IV, 1998
- Gustafson, Donald, "Homestake Exploration Geologist, 1975-1990"
- Hanchett, Bonny Jean, "Owner and Editor, Clearlake Observer, 1955-1986"
- Hickey, James, "Director of Conservation, Development, and Planning for Napa County, 1970 to 1990"
- Jago, Irene, "The Jagos of Jago Bay, Clear Lake"
- Jonas, James, "Lake County Fuel Distributor"
- Koontz, Dolora, "Environmental Engineer, McLaughlin Mine, 1988-1995"

The Knoxville Mining District, The McLaughlin Gold Mine, Northern California, Volume V, 1998

- Kritikos, William, "Operator, Oat Hill Mine"
- Landman, John, "Rancher, Morgan Valley"
- Lyons, Roberta, "Journalist and Environmentalist"
- Madsen, Roger, "Homestake Mechanical Engineer"
- Magoon, Beverly, "Merchant and Craft Instructor, Lower Lake"
- McGinnis, Edward, "Worker at the Reed Mine"

The Knoxville Mining District, The McLaughlin Gold Mine, Northern California, Volume VI, 1999

- McKenzie, Robert, "McKenzies in Monticello, Berryessa Valley"
- Moskowite, Harold, "Napa County Supervisor"
- Onstad, Marion, "Neighbor and Employee of the McLaughlin Mine, 1980-1994"
- Parker, Ronald, "Resident Manager of the McLaughlin Mine, 1988-1994"
- Stoehr, Richard, "Homestake Engineer and Geologist to Senior Vice President and Director"
- Strapko, Joseph, "Exploration Geologist, McLaughlin Mine Discovery, 1978"

The Knoxville Mining District, The McLaughlin Gold Mine, Northern California, Volume VII, 2000

- Jack E. Thompson, Jr., "General Manager, McLaughlin Mine, 1981-1988"
- Twyla Thompson, "County Supervisor, Yolo County"
- Avery Tindell, "Capay Valley Environmentalist"
- John Turney, "McLaughlin Metallurgist: Pioneering Autoclaving for Gold"
- Della Underwood, "Knoxville Rancher, McLaughlin Mine Surveyor"
- Walter Wilcox, "County Supervisor, Lake County"
- Peter Scribner, "Knoxville Mine"

The Knoxville Mining District, The McLaughlin Gold Mine, Northern California, Volume VIII, 2002

- Enderlin, Dean, "Mine Geologist, Reclamation Manager, McLaughlin Mine"
- Harrison, Susan, "McLaughlin Natural Reserve"
- Krauss, Raymond, "Environmental Manager, McLaughlin Mine"

Regional Oral History Office
The Bancroft Library

University of California
Berkeley, California

Western Mining in the Twentieth Century Series
Knoxville/McLaughlin Project

Dean Enderlin

MINE GEOLOGIST, RECLAMATION MANAGER, McLAUGHLIN MINE

An Interview Conducted by
Eleanor Swent
in 2001

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Since 1954 the Regional Oral History Office has been interviewing leading participants in or well-placed witnesses to major events in the development of Northern California, the West, and the Nation. Oral history is a method of collecting historical information through tape-recorded interviews between a narrator with firsthand knowledge of historically significant events and a well-informed interviewer, with the goal of preserving substantive additions to the historical record. The tape recording is transcribed, lightly edited for continuity and clarity, and reviewed by the interviewee. The corrected manuscript is indexed, bound with photographs and illustrative materials, and placed in The Bancroft Library at the University of California, Berkeley, and in other research collections for scholarly use. Because it is primary material, oral history is not intended to present the final, verified, or complete narrative of events. It is a spoken account, offered by the interviewee in response to questioning, and as such it is reflective, partisan, deeply involved, and irreplaceable.

****

All uses of this manuscript are covered by a legal agreement between The Regents of the University of California and Dean Enderlin dated January 10, 2001. The manuscript is thereby made available for research purposes. All literary rights in the manuscript, including the right to publish, are reserved to The Bancroft Library of the University of California, Berkeley. No part of the manuscript may be quoted for publication without the written permission of the Director of The Bancroft Library of the University of California, Berkeley.

Requests for permission to quote for publication should be addressed to the Regional Oral History Office, 486 Library, University of California, Berkeley 94720, and should include identification of the specific passages to be quoted, anticipated use of the passages, and identification of the user. The legal agreement with Dean Enderlin requires that he be notified of the request and allowed thirty days in which to respond.

It is recommended that this oral history be cited as follows:

Dean Enderlin, "Mine Geologist, Reclamation Manager, McLaughlin Mine," an oral history conducted in 2001 by Eleanor Swent in *The Knoxville Mining District, The McLaughlin Gold Mine, Northern California, Volume VIII,* Regional Oral History Office, The Bancroft Library, University of California, Berkeley, 2002.

Copy no. ______

Dean Enderlin

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INTERVIEW HISTORY--Dean Enderlin

Dean Enderlin, a recent college graduate, began to work at the McLaughlin Mine in 1985 as a temporary helper in the geology department, and by 2001 when I interviewed him he was Senior Environmental Engineer and directing reclamation of the mine. His knowledge of local history was valuable to the Knoxville-McLaughlin oral history project from the beginning. I used his articles on local history from "The Gold Piece", the mine newsletter, as sources of information, and took his advice on spelling of place names when written sources varied. He facilitated interviews of people connected with the historic mercury mines: Tony Cerar, Elmer Enderlin, Edward McGinnis, Robert McKenzie, and Della Underwood. The last three of those interviews include the heartbreak of the damming and flooding of the Monticello Valley, where their families had lived for nearly a century, to form Lake Berryessa; they add another dimension to the history of Knoxville.

The letter of invitation to be interviewed was sent to Dean Enderlin in June of 2000 and the interview was conducted at his home "Rattlesnake Acres" near Calistoga at the end of the Napa Valley on 10 January 2001. He lives with his father Roy in an authentic one-story ranch house, set in a vineyard. The driveway on this day is filled with trucks and cars, all in good condition, belonging to a crew of Mexicans who were pruning the vines. The house is a double one, built with a suite for his grandmother who lived with them for twenty years. As we walk through the living room I notice a copy of Jacques Barzun's recent book, "Dawn to Decadence," and learn that both father and son are currently reading it. We pass two large antique oil portraits of a well-dressed man and woman with an interesting provenance: a Norwegian seaman forebear had photographs taken, presumably of his parents or grandparents, took the photos to China to be copied in watercolor, and then had oil paintings made from the watercolors.

We go through one kitchen and into another room, now Dean's office, which has its own kitchen and bath. The window overlooks the busy vineyard. Furnishings include an antique oak roll-top secretary desk and a very new computer-scanner-printer setup. We interview at a formica table; on it stands a small antique bronze statue of a European miner wearing boots and cloth cap, and carrying a pick and carbide lamp. He tells in the interview that the presence of gold in the Knoxville area was first mentioned in the Whitney geologic survey report of 1865, at about the same time that the Enderlin family moved from Germany to settle in Napa and Lake Counties.

The interview also includes an unusually articulate description of gold dredging and panning, a hobby which he pursued as a boy and which aided his later profession:

> ... the general rule of thumb is, the more junk you're dredging up, the better the signs that you're in the good stuff, you're in a pay streak. Because all the heavy metal in the creek will tend to move down the creek in a line, in a streak. If you're in that part of the

> creek where the heaviest particles are being moved in the gravel, you know that you're also in the area where the highest likelihood of finding gold nuggets would be. You don't try to dredge the whole creek; you try to follow these little streaks....
>
> You have to be a pretty good gold panner in order to separate gold from black sand, because the gold isn't that much heavier than the other material. A gold pan operates on the principle that the greater the difference in the densities, the easier it is to separate out one mineral from another. You pan it down very, very carefully, watching to make sure no gold is lost....When you get down to the last fraction in the pan, you simply bump the pan--you have water in it with the gold and the black sand--and when you bump the pan sideways, the gold will kind of jump away from the black sand very, very slowly, and you can kind of scrape away the gold. It's a tedious process.... In terms of mining economics, it doesn't add up very well. On my best year, just for fun I sat down and calculated the economics of it, and concluded that my absolute best wages would have been about a dollar an hour. And that was really in the sweetest gold that I ever hit.

We take a mid-day break; in the bathroom is an art photo of a prospector panning. His father joins us for lunch and I eat two large bowls of delicious chile beans. When I leave, I am given a bag of fresh walnuts which Roy Enderlin has shelled and the McLaughlin Mine cookbook with the recipe for Dean's Beans. I also carry with me a warm memory of family closeness, productive work, and wide-ranging thought.

The tapes of the interview were transcribed and the lightly edited transcript was sent to Dean Enderlin for review. He returned it promptly with only a few corrections, neatly indicated. The manuscript was amended and indexed at our office. The tapes are deposited in The Bancroft Library and are available for study.

The Dean Enderlin interview is one of more than forty interviews which were conducted by the Regional Oral History Office from 1993-2001 in order to document the development of the McLaughlin gold mine in the Knoxville District of Lake, Napa, and Yolo Counties, California, from 1978-2001, as part of the ongoing oral history series devoted to Western Mining in the Twentieth Century. The Regional Oral History Office was established in 1954 to record the lives of persons who have contributed significantly to the history of California and the West. The office is under the direction of Richard Cándida Smith, Director, and the administrative direction of Charles B. Faulhaber, The James D. Hart Director of The Bancroft Library, University of California, Berkeley.

Eleanor Swent, Project Director, Research Interviewer/Editor

August 2001
Regional Oral History Office
The Bancroft Library
University of California, Berkeley

Regional Oral History Office
Room 486 The Bancroft Library

University of California
Berkeley, California 94720

BIOGRAPHICAL INFORMATION

(Please write clearly. Use black ink.)

Your full name Dean Andrew Enderlin

Date of birth 11 Sept. 1961 Birthplace Calistoga, CA

Father's full name Roy Dean Enderlin

Occupation Farmer Birthplace Calistoga, CA

Mother's full name Lucille Adele Jacobsen

Occupation Teacher Birthplace Pacific Grove, CA

Your spouse/partner (divorced)

Occupation Birthplace

Your children (none)

Where did you grow up? Calistoga, Napa County, CA

Present community Calistoga

Education 1982-84 Sonoma State University (B.Sc. Geology 1985)
1979-82 Napa College (A.S. Drafting Technology 1981, A.A. 1982)

Occupation(s) Geologist and Environmental Engineer, Homestake McLaughlin Mine 1985-Present

Areas of expertise Geology, mining history

Other interests or activities Genealogy, local history, fossil collecting

Organizations in which you are active Fellow, Society of Economic Geologists

SIGNATURE

DATE: 30 July 2001

INTERVIEW WITH DEAN ENDERLIN

I FAMILY AND EDUCATION

[Date of Interview: January 10, 2001] ##[1]

The Enderlin Family, Lake and Napa County Farmers and Growers

Swent: Dean, it's a beautiful day. You have your pruners, you said, out there in your vineyard?

Enderlin: Working in the vineyard, pruning grapevines. We usually start in December, right around Christmas time, and so this is one of the busy times of year to be working with the grapevines.

Swent: Have you had vines here very long?

Enderlin: My dad purchased this property here in Calistoga in 1952, and at the time it was planted primarily in prunes, which was the big industry here in the Napa Valley at that time. Then starting in the late 1960s he began to plant the vineyard over; remove the prunes and plant vineyard.

There was a disease that affected the prune industry. If you drive up and down the Napa Valley today you'll see very few prune trees left. Most folks think of a prune as being a plum, and it's a type of plum, but it's very small, called a French prune. It was usually dried, dehydrated, and it was a big industry back in the early days. That industry, because of the disease and because of the economics, it has faded, and so now we have grapes.

Swent: Have you had phylloxera?

Enderlin: The phylloxera is no doubt here, but our vineyard was planted at a time when the standard rootstock was what was called the

---

[1] ## This symbol indicates that a tape or tape segment has begun or ended. A guide to the tapes follows the transcripts.

St. George. The St. George is a native American wild grape root, and it's resistant, naturally resistant, to the phylloxera. In later years, I guess somewhere probably in the seventies, the University of California developed alternatives that were more compatible with the European grape varieties. The wine grapes that we make the wine from are not native American grapes, they're imported. So they are susceptible to this root louse, the phylloxera. So we graft the imported grape onto the rootstock. They're not compatible, though. The native rootstock is very vigorous. It wants to deliver a lot of energy into the grapevine, and the European varieties can't handle that much energy, that much strength, coming into the system, so they tend to not fare well with the older style roots; not as good as if you could develop a root that would be more compatible.

Enter the university. The university developed a number of clones, these hybrids that were mixes of the native and nonnative varieties, to create a root that was compatible. The most widely used in the seventies was a clone that was known as AXR1. If you speak the name AXR1 in the Valley today, you'll be greeted by venomous looks, because it--as it was promised when it was first developed, it was resistant but not immune to the phylloxera, and so during periods of drought or perhaps some other conditions that would have put stress on the grapes, a resistant root may not be capable of withstanding the other pressures on the grapevine. So the phylloxera really gained a foothold in the Valley.

Our vineyard, because it's planted on the St. George root, was unaffected by it. Even though our grapevines may not be as compatible and optimized, you might say, they're certainly in the long run the better choice considering the consequences of the phylloxera.

Swent: What is the grape that you grow?

Enderlin: We have three varieties here. The bulk of the acreage on our property, a total of nineteen acres, is planted to Petite Sirah. We also have Chenin Blanc, and Napa Gamay. The three varieties were planted for a reason. The grape industry is very trendy. At any given time one variety will be very popular, while other varieties will be out of vogue. At the moment the Petite Sirah is the big variety here, commanding very high prices per ton. It makes a very heavy wine. But right now people's tastes have gone that direction to where people like heavy, dark, thick wine.

Swent: It's a red.

Enderlin: It's a red wine. And if you spill some on a white shirt you might as well throw away that shirt, because it's a very, very dark wine, like ink. In past years the Chenin Blanc was a very popular variety, a white grape. It no longer is. It commands the lowest price right now. The Napa Gamay has also gone through periods of popularity, and it's still pretty trendy. We sell our Gamay to Beringer now. Beringer makes two different types of wine out of it; a Gamay Beaujoulais, and what's called a Gamay Nouveau. The nouveau is a process that is used or is created from a process called carbonic maceration.

Don't you love those technology terms? What it creates is a wine that's drinkable immediately. From the economics of a winemaker, that's ideal. You have less time sitting aging. You can deliver it to market right away and have great cash flow consequences. So Beringer has done very well with that. Much like the White Zinfandels, you know, which were popular for a while, and still are to some extent. White Zinfandel, like the name implies, is a white wine made from a red grape. And it can go to market much earlier than if you were to make a Zinfandel the conventional way as a dark wine, a red wine. The winemakers are always thinking how to create a trend, and how to create a trend that pays off.

Swent: And you've had to keep up with that.

Were you born here in Calistoga?

Enderlin: Yes, I was born at what is now St. Helena Hospital, September 11, 1961, and my father was also born in Calistoga.

Swent: And your family has been here for a long time I understand.

Enderlin: Yes, well, the Enderlin family, when they first arrived in America, settled in San Francisco. In the 1890s they moved up to Lake County.

Swent: When did they first come to San Francisco?

Enderlin: 1885.

Swent: Not in the Gold Rush period?

Enderlin: Not in the Gold Rush period. No, they came fairly late in the period of the German immigration.

Great-grandfather Wilhelm Enderlin Left Germany

Swent: Where were they from?

Enderlin: Well, they came from southern Germany.

Swent: A winegrowing area, maybe?

Enderlin: Well, actually they did. They came from a town called Bötzingen, which is near Freiburg in southern Baden region of Germany. It's in a winegrowing region called Kaiserstuhl, and Kaiserstuhl is a very old winegrowing region. Goes back to Roman times.

We don't know that much about what our ancestors did there. Most of our ancestors were blacksmiths in this very small little town. There are some family tales that suggest that perhaps our great grandfather, Wilhelm Enderlin, did work in the winegrowing business. There are also rumors that he enjoyed drinking the wine a little too much, which was one reason why he left Germany. These are all just family lore. No one knows for sure.

Whatever the reasons, the family left Germany to get away from something; that's really all we know. We know that he left the German military. Supposedly he was high-ranking, or very prominent in the Kaiser's personal guard. He was in the military; we do know that and we know that he swore that he wanted no part in the military. In the 1880s in Germany you had Bismarck and the Kaiser becoming increasingly warlike. We can gather that our great-grandfather wanted to get away from there for that very reason.

It's one of the classic family stories that's told is, when the ship was passing across the Atlantic, he made sure to ask the captain at what point they reached the middle of the Atlantic. At that point he ceremoniously threw his medals overboard and closed the door on all the past in Germany. That's the story and we really don't know much more about that, although I'm trying to dig into it to learn more.

Swent: A great story.

Enderlin: When they settled in San Francisco, I gather that the family took on whatever jobs were available. We don't know too much about the history there. They came up to Lake County in 1896 on the invitation of Wilhelm's--one of his daughters. My great-aunt Louise had recently married; she married a gentleman named Ed Hinton, who was one of the Cobb family of Cobb Mountain. There's a tie to Lake County history there. Apparently the Cobbs had land that they were willing to sell or give in some form to the family, and so the family chose to move from the city up to Lake County. It is said that one reason why they wanted to leave the city, too, was for health reasons.

My great uncle, Henry, who was the father of Elmer Enderlin, who has already been interviewed, was very sickly in the city. He had respiratory problems. One reason for them leaving the city, was to get him away from the fogs and into a dryer climate.

Grandfather George Enderlin of Calistoga

Swent: A classic story, again, isn't it? People came to Calistoga for their health.

Enderlin: Yes, my grandfather came back down to Calistoga. The family actually passed through Calistoga and settled near Lower Lake in a little valley in an area called Spruce Grove. After World War I, my grandfather settled here. So sometime between say 1918 and 1920 he settled here in Calistoga. The other members of the family, Henry's family, stayed in Lake County. That's why we have the Napa Valley Enderlins and the Lake County Enderlins.

Swent: Was your father farming up in Lake County?

Enderlin: Well, the Lake County Enderlins all lived on a farm. And my great-grandfather Wilhelm--they lived on a subsistence farm in the Spruce Grove area during very tough times, very difficult economic times. Things weren't that much better down here in Calistoga either. In both cases they were primarily subsistence farms: raising fruit, raising chickens; in the case of the Lake County family, one of their big commodities was goats. They raised goats for shearing for mohair, and also for milk. It was kind of a combined effort there to survive in very difficult times.

Swent: It was your grandfather then who moved down to Calistoga?

Enderlin: That's correct. My grandfather's sister had moved here a few years before he had. My grandfather was a sibling in a fairly large family. Wilhelm, his father, had several boys and a number of girls. One of the daughters, Lena, moved down here to Calistoga first. We don't know why our grandfather came down here, but it's quite possible it's because she lived near by, and so they settled in together.

That started the Enderlins here in Calistoga. My grandfather lived here; my father was born here, as was my uncle. My grandfather was George Enderlin, and he had two sons, Roy and Arnold. Roy is my father. Arnold, my uncle, also lives here in Calistoga, and was an electrician for many, many years, and has been retired for quite a few years. His family has moved on. Arnold's family consists of two daughters and a boy, and the closest is the daughter, who lives in Benicia.

Mother Lucille Jacobsen, High School Teacher

Swent: Was your mother's family a native family also?

Enderlin: My mother was born on the Monterey Peninsula. She was born in Pacific Grove. Her father was the chairman of the Monterey County Board of Supervisors for many years, from the thirties up until the fifties.

Swent: What was his name?

Enderlin: His name was Andrew Jacobsen.

Swent: Danish.

Enderlin: Yes, he was Danish. Yes. My mother chose to come to Calistoga to be a teacher.

Swent: What was her name?

Enderlin: Her name was Lucille Jacobsen. Upon arriving here in Calistoga, it wasn't long that some mutual friends of my dad and her introduced them, and they hit it off and got married. They were married in 1949.

Swent: Where had she gone to school?

Enderlin: She went to college during wartime, so she jumped around to many different campuses depending upon what was available for a curriculum. She started out going to Oregon State University, and eventually had to move back down here to Salinas Junior College. She got her teaching credential at Berkeley.

It was upon receiving her credential that she came up here and got a job at Calistoga High School. Her background was home economics and physical education. She was a girl's P.E. teacher for many, many years, and taught the local "home ec" courses. I think she also taught some general science courses. How on earth she was coerced into teaching general science, I don't know. I don't think she enjoyed that very much, but I guess as a teacher one teaches what one is told to teach under the circumstances.

Father Roy Enderlin, Farmer

Swent: What about your father: did he go to college?

Enderlin: He attended the University of California at Davis, but only for a brief period of time. He studied agriculture, and concluded after a fairly short period that he could just as easily teach himself what he needed to know, and so he ended his college education without getting a degree. I think, considering what his interests were, the theoretical side of agriculture was less appealing to him than the practical applied standpoint.

Swent: Just doing it.

Enderlin: Just doing it.

Swent: Do you have siblings?

Enderlin: No, I'm an only child.

Swent: Your mother got you interested in science, maybe?

Enderlin: I think so. You know, the interest in geology was a very late-developing interest. I had no feeling at all for, or interest in, science, really until I got into college. When I graduated from Calistoga High School in 1979, I really didn't know what I wanted to do or what I wanted to be.

Dean Enderlin Likes Maps and Geology

Swent: Did you have any teachers that you particularly want to mention?

Enderlin: Oh, absolutely. There were a number of very inspiring teachers. Mr. Richard Johnson was my science teacher who gave me some wonderful background in just general sciences. Russell Archerd was another science teacher who was very good at what he did. He has just recently passed away. Richard Johnson is still teaching in Calistoga High School today.

When I graduated I really didn't know what I wanted to do, and I had resigned myself to taking over and working on the ranch. That was simple enough. And my mother said no, you're going to go to college. Whether you want to or not, you're going to experience college. [chuckles] So I went to Napa College, now called Napa Valley College, a junior college. Started out in a major that kind of represented most of my interests at the time, and that was drafting, mechanical drawing.

I had spent a lot of time doing art, and the idea of artistic rendering and doing something in an artistic manner that could be more mechanically applied was appealing to me. I had chosen early on that I was not going to be an artist. I didn't want to starve. [laughs] So I decided, well, we'll put a different twist on that and look at it from a standpoint of more of a mechanical aspect.

What I found in the drafting was: of the different things that we were taught, one aspect of drafting that I liked the most was cartography. Working with maps and creating maps was really very appealing to me. And I also--during the course of the two years that I spent getting my Associate in Science degree in drafting, I took some other electives, one being geology. The geology course I took was taught by a gentleman named Robert Beatie, who is still here living in the Valley today. And he was a very good instructor. He made it interesting. He made it fun.

As I say, this was just on a whim I took this course, and after I finished it, I realized that I really liked geology. And it also matched closely with some of my other interests, such as the map making, because the two go hand in hand. So after I had taken the course, and I had received my degree in drafting, I decided, well, maybe I should ask around and see how to pursue, or where to pursue a higher education in geology. I asked Bob Beatie and I asked another professor there at the college, where I should go. This other professor suggested Stanford University, and Beatie suggested Sonoma State University.

The Sonoma State suggestion took me by surprise. I had no clue that they even had a geology department there. But he recommended them; he said that in terms of the practical application of geology, Sonoma would deliver a very high quality program. So I went there and chatted with the faculty, and looked around the department, and liked what I saw. I ended up transferring to Sonoma State to get my Bachelor of Science degree.

Swent: When did you finish, then?

Enderlin: Well, I spent an extra year or so at Napa College, to get some general education classes.

Swent: That would have been--

Enderlin: Transferred in 1981, '82.

Swent: By then the McLaughlin Mine had been in the news.

Enderlin: Yes. Yes. That's right. My decision to go into geology was about the same time as the notice of the discovery of the McLaughlin deposit was made.

Swent: You graduated from high school in '79; had there been anything in the news yet about the mine?

Enderlin: Well, the first news I heard on the radio, and it was a very exciting thing.

Swent: You were still in high school.

Enderlin: No, actually, it wasn't publicly announced until 1981, so the work was going on up there at the McLaughlin Project.

Swent: You hadn't heard rumors of that around here?

Enderlin: There were no rumors circulating. It was very quiet. They did an excellent job. You have to give Jim Anderson credit for keeping a lid on it, because very few people knew, and those that did know were quite tight-lipped about the exploration.

Swent: Even your family up in Lower Lake didn't know?

Enderlin: Nothing was said. So until they made the official announcement--Homestake waited until it had gone to a fairly advanced stage of exploration before they made the announcement. Word was very quiet around here. There was just no news at all that that gold mine was in the process of being discovered.

And when you think about it, that is amazing that it didn't spread, because by then they had a significant number of diamond drills that had been running since 1978 and '79, they were drilling up there. And with that much activity it would be pretty hard to hide.

Swent: It's really surprising that traffic through Lower Lake and--

Enderlin: Well, one has to remember what Morgan Valley Road looked like back then, too. It wasn't exactly a thoroughfare. It was a one-lane gravel, wind-y road. Some people drove it, but it's not quite like it is today, where it's like a highway going out to the mine. So being where it is at the northernmost tip of Napa County, it's a long way from civilization, you might say. Very few people would have passed by there, and those that would have wouldn't really have known what was going on anyway. So, yes, the announcement was a big deal.

Gold had always been kind of interesting for me. I had panned for gold since I was pretty young, about twelve years old. I liked gold prospecting.

Panning Gold from the Age of Twelve

Swent: When did you do that?

Enderlin: Well, my dad got me started on it. The first panning I did was in Calaveras County. Some of the other Enderlin cousins own a ranch near San Andreas, and we used to go to this ranch on occasions. My dad went there for many years deer hunting. It used to be an annual social event for all the Enderlin cousins who were deer hunters to converge on this ranch, usually around November when the deer season opened up.

And so we agreed that the first gold panning I would do would be there at what was called the 6-E Ranch. 6-E stood for the six Enderlin brothers that formed a partnership to purchase this ranch. So anyway, that got me hooked. I did catch gold fever very badly, although I didn't find much gold.

Swent: This was when you were just a boy.

Enderlin: I was twelve years old, yes. So that was my first start at it. Then in later years I graduated to a sluice box, and then to a little suction dredge, and really got hooked. Really got hooked with the gold fever bad.

Swent: Just in Calaveras?

Enderlin: Well, I moved around. I had several friends that I had gone to high school with who were still in the area. The first couple of years that I went to the 6-E Ranch, the first year I just went with my dad, and the next year I brought friends. Then one of these friends ended up tagging along with me every summer. We began to do it as a regular thing.

Swent: What's his name?

Enderlin: His name is Mark Veraguth. It's a Swiss name. Mark and I still try to get together every year. We've only missed a few seasons where we've gotten out in the summertime to go prospecting. Never made it rich, but we do have gold. We do have little gold nuggets and stuff we've found, especially in later years when we got our dredges and started getting a little more serious.

The suction dredges increase your chances of finding gold, but they also increase the amount of work you have to do. Very, very strenuous work, working in cold water in the stream, moving the rocks around.

Finding Gold with a Suction Dredge

Swent: Do you dare tell where you have done this dredging?

Enderlin: We have changed. Every year we would look at the map and almost literally throw a dart at it and see where the dart would fall. We would move around from place to place. In Calaveras County we were panning on a small creek near San Andreas called O'Neil Creek, but we eventually panned on the Yuba River and the American River, and the Feather River. In the end, when we purchased our dredges, we ended up going up even further north into Butte County to Butte Creek. A friend of ours had recommended Butte Creek as a spot to go because there were no mining claims.

With a dredge you had to be careful where you set it up for fear, you know, that if you were on someone's mining claim you would be a threat. So we liked this particular area, and this friend had recommended it to us because it had been withdrawn from claiming. It was a recreation area open to anybody to use with a suction dredge, but nobody could claim it and exclude anyone else. So that made sense for us to start out.

Swent: The dredging was allowed under a recreation permit?

Enderlin: Yes. Yes. It was an experimental program up there. It did get out of hand. So many dredgers ended up going up there. This was in the early eighties during a time when the gold price was going up, and interest in gold dredging was at a peak.

Swent: I remember seeing things in the paper about just hundreds of people going prospecting.

Enderlin: Yes, and that's the way it was up there. It got to the point where it was just overcrowded. Too many people working there. And we continued to go, and eventually it reached the point where--this was BLM [Bureau of Land Management] land. It reached a point where the BLM stepped in and created a more organized system where they defined hundred-yard segments of creek. Basically you would lease a hundred-yard stretch. That way there would only be one dredge per hundred yards, not dozens of them, as there had been during one period of time in the eighties.

Swent: Just like a hundred years earlier.

Enderlin: It was like a gold rush. It was like a gold rush up there. You had very nice people and you had very bad people all converging in the Sierra foothills. It was a new gold rush.

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Swent: Were you camping when you were doing this?

Enderlin: Yes, the area of Butte Creek where we went to had no campgrounds or anything set up for the public. It was just rough camping, so we would bring in all of our supplies. It was a lot of fun, and we did that for many years.

Swent: Just like the gold rush and the 49ers.

Enderlin: Very much so. We met a lot of nice folks. Ironically one year we had seen this older couple working above us. "Older" meaning probably late fifties, early sixties. But still--

Swent: Well, you were nineteen.

Enderlin: Yes, for someone in their twenties looking upstream and seeing someone in their sixties working a gold dredge was quite impressive, because it is hard work. [laughs] When you come away feeling sore at the end of the day when you're in your twenties, you've got to think, wow!

Swent: What power is the dredge?

Enderlin: It's measured based on the inlet, the intake, and the diameter. And mine is what is called a two-and-a-half-inch dredge. It's very small. They make dredges--suction dredges can be as large as twelve inches diameter, you know, literally sucking rocks that big, big cobbles. Very powerful. Those sorts of dredges are powered by Volkswagen engines. Mine is powered by a little lawnmower engine, so it's very small and easy to manage for one person, which is why I chose to go that route.

Swent: Is it sort of like a vacuum cleaner that you're moving around?

Enderlin: It's literally a vacuum cleaner under water. It's an interesting thing to work in that you can see the gold under water as you dredge. Water magnifies the gold, so what you see is about four times larger than it really is. You'll see it shine at the very bottom of where you're working if you find the gold. Of course when you reach down to pick it up, your fingers suddenly look four times larger and you realize when you get a sense of the scale that what you're picking up isn't that big.

But yes, it's a process of throwing rocks, throwing boulders that don't go through the dredge off to the side and then sucking up the finer material. The finer material passes upwards into a sluice box, which is an integral part of the dredge. The sluice box is just a series of aluminum riffles. These slanted slats that run down a trough that capture all the heavy minerals that are in the gravel. Not only do they capture gold, they also capture a lot of other heavy minerals that everyone refers to as black sand. At the end of the day when you clean up, what you have is what we call a concentrate. It's a mixture of black sand with particles of gold and whatever other junk you dredge up. You get lots of lead shot, and bullets, and coins, and nails, and stuff like that.

In fact the general rule of thumb is, the more junk you're dredging up, the better the signs that you're in the good stuff, you're in a pay streak. Because all the heavy metal in the creek will tend to move down the creek in a line, in a streak. If you're in that part of the creek where the heaviest particles are being moved in the gravel, you know that you're also in the area where the highest likelihood of finding gold nuggets would be. You don't try to dredge the whole creek; you try to follow these little streaks.

Swent: What do you do with your concentrate, then?

Enderlin: Then comes the tedious part. There are different ways to treat concentrate. What I've always done is simply pan it down. You have to be a pretty good gold panner in order to separate gold from black sand, because the gold isn't that much heavier than the other material. A gold pan operates on the principle that the greater the difference in the densities, the easier it is to separate out one mineral from another. There is a technique that can be done. You pan it down very, very carefully, watching to make sure no gold is lost.

Swent: Of course.

Enderlin: When you get down to the last fraction in the pan, you simply bump the pan--you have water in it with the gold and the black sand--and when you bump the pan sideways, the gold will kind of jump away from the black sand very, very slowly, and you can kind of scrape away the gold. It's a tedious process. There are better ways to do it, but for us on a low budget, that's what we chose to do.

Swent: And then what?

Enderlin: Then we put the gold in the vial, and then we go look for some more. [laughs]

Swent: In a vial.

Enderlin: Yes. Usually you cull the gold with a small spoon or a pocket knife or whatever, and place it in a vial, a glass vial. And that's the end product.

Swent: And then?

Enderlin: A lot of folks would sell their gold for jewelry. Some folks would sell it to a refiner. We never got that much. We never got to the point where we were ready to go to market. But we had fun. We treated it more like a camping trip than anything else. A good chance to get out every summer and get away from it all.

Swent: Were you threatened by robbers?

Enderlin: We never were. The area that I went to was generally occupied by families. Although I had heard stories of people who had seen some shady characters. But no, we had very good experiences there, and never had any problems.

One experience that was ironic for us, was one year--and I was mentioning this older couple--we were chatting with them one day. They were very nice folks. And talking about where we came from, I had mentioned that I was from Calistoga. And the lady who had been working the dredge with her husband, gave me kind of a surprised look, and she says, "Really! I'm from Calistoga, too, but I haven't lived there for some years."

We continued to talk a little bit about Calistoga, and I finally mentioned that my name was Enderlin. She looked at me and gave me this just astonished look and said, "You're Dean." It turned out she was one of my mother's students, when my mother was teaching at Calistoga High School. So it's a small world.

Swent: She had heard about you.

Enderlin: It's a small world.

Swent: Oh, yes. Do people like that stay there all summer, or were they just there briefly?

Enderlin: No. It was only open during the dry season. And there's the dredging rules. California laws are set up so that different streams are managed in different ways. The Department of Fish and Game limits the length of the season to only a few months in the summer on this particular creek we went to. This was called Butte Creek.

So that was our dredging. I still have the dredge, although I haven't been out for a few seasons with it.

Swent: How much does a dredge cost?

Enderlin: Well, they have gone up in value. When I bought it it was only $400, and now it would be well over $1,000, maybe closer to $2,000.

Swent: But you had to get quite a lot of gold just to pay for it.

Enderlin: Well, of course all the operating expenses have to be considered, too. In terms of mining economics, it doesn't add up very well. On my best year, just for fun I sat down and calculated the economics of it, and concluded that my absolute best wages would have been about a dollar an hour. And that was really in the sweetest gold that I ever hit.

Swent: But if you never sold the gold.

Enderlin: Yes, it's all paper. [laughter]

Swent: You still have the gold?

Enderlin: Oh, yes, sure.

Swent: What fuel did you use?

Enderlin: Gasoline.

Swent: Regular gasoline.

Enderlin: Just like a lawnmower engine. Very simple little machine. But anyway, it hooked me. I got gold fever bad.

Swent: It sounds like a lot of fun.

Enderlin: So even before I had made the decision to go into geology, I was still very actively panning for gold.

Swent: You were on the edges without knowing it.

Tell about your studies then at Sonoma State. You did mention your teacher Beatie.

Enderlin: He was the professor at Napa College that recommended Sonoma State.

Swent: What about teachers there at Sonoma?

Enderlin: There were a variety of professors there. All of them are really good.

Swent: Did you stay there? Did you live in a dorm?

Enderlin: Yes, I lived in the dorms. The first year I commuted, but that soon ended. I found that the commute was just too great. So I stayed in the dorms. A lot of times, if I was too tired I would even stay in motels down there, and it just--that didn't work. That did not work. So later on I stayed on campus, which was great. I really enjoyed that.

Sonoma was a small geology department, very close and very personal interaction with professors, which was a wonderful thing. I was very glad I made the decision to go there. And very strongly field-oriented. Each class typically involved some level of work out in the field. So it was not just textbook work, and we went all over. A lot of time was spent in Nevada. The Death Valley area as well. In Nevada, it's kind of interesting that one of our field areas was not far from Homestake's Ruby Hill Mine, so when people talk about the formations around Ruby Hill, I'm quite familiar with them because I have mapped them out there.

Sonoma State was a very, very nice experience, and I came away feeling like I had a good education there.

Swent: Did you meet Ray Krauss?

Enderlin: No, although Ray had taught there and been involved with Sonoma State, I never met him when he was there. It's quite possible that we overlapped at the time. I believe that was a period in time when he might have been doing some teaching there. But at the time the environmental end of things was pretty alien to me. The geology group was really, really close-knit, and I guess a lot of the other departments we didn't mingle with.

Swent: Well, you were out in the field sometimes, too.

Enderlin: That's true. I did also, as part of my training at Sonoma State, did spend a summer at the University of Nevada at Las Vegas. We were required before we could graduate to be farmed out to some other college. I can say that UNLV was my other alma mater. I spent a summer down there.

Very interesting summer, too. We basically covered all of southern Nevada looking at geologic features, and passed through Utah, Bryce Canyon, Zion, and up into Wyoming, eventually ending up at Yellowstone. That gave me a really wonderful experience in seeing a lot of the big geological features of the West.

Swent: Wonderful way to spend the summer.

Enderlin: Yes. So I graduated from Sonoma in January of 1985. I ended up spending a few extra semesters trying to catch up on some of the course work. When I graduated I had a fairly good feeling that I might get hired on by Homestake at that time. In 1984 I had met up with some Homestake geologists that were here in Calistoga. It all kind of comes back here to Calistoga, it seems.

Leading Geological Reconnaissance Tours of the Palisade Mine

Swent: Who where they?

Enderlin: It was Norm Lehrman, Jeff Wilson, and a graduate student, and although I was introduced to him, I didn't write down his name, but I believe it was Jim Thordsen. Norm Lehrman was the chief geologist at the McLaughlin Mine at the time, and Jeff Wilson was the senior geologist. At that time there were a number of students doing master's degree work there, and Jim was one. Anyway, they were here in the Calistoga area investigating the local gold and silver mine, the Palisade Mine. And they had come into this area on the invitation of our neighbor.

Over the hill, to the north of our property, there are a series of old patented mining claims. Patented, meaning purchased from the government. And this elderly couple was living on these claims. And she was--

Swent: What was their name?

Enderlin: The last name was Williams. Her name was Enid, and his name was Maurice. She was the granddaughter of R. F. Grigsby, Robert F. Grigsby, who was the founder of the Palisade Mine in the 1880s. The Palisade Mine was a gold and silver mine, primarily silver.

After Homestake had made its announcement, this region was swarming with crews of geologists. It was kind of a standard practice for me to tour geological reconnaissance groups around the Williams property. They were elderly and they really couldn't get around very well to show all their mining claims. It was Maurice's dream to see the Palisade Mine go back into production. I would accommodate every group of geologists that came to their property by giving them the official tour around the site. Not just their property, but also the adjacent property, which was the Palisade Mine proper.

Their property consisted of a series of mining claims that Grigsby had patented, but never developed. He had always told them that these claims would provide for the family in later years, that there was plenty of silver there that he was not going to develop right away. I think he was right. I think there is silver on the property that's certainly not thoroughly developed. By modern economics you could probably never go after it.

But anyway, before the Homestake group arrived, I had probably toured two or three other geology groups from other companies, and so I was getting pretty good at it. The difference with the Homestake group--this was in July of 1984--was that at the end of the tour, Norm Lehrman asked if I would be interested in hiring on. So that was the start of my contact with the McLaughlin Mine.

II McLAUGHLIN MINE GEOLOGIST, RECLAMATION MANAGER

Hired by Homestake for Geological Reconnaissance

Swent: By then they were actively developing it.

Enderlin: Well, they were just beginning to develop. In '84 the pre-mine stripping had begun. Norm had only recently been hired on himself. I think he had been hired that spring in 1984. Jeff had been on the site previous to Norm. So the two of them were to be the Geology Department. What had happened, though, was that as they had begun to mine into the ore body, they realized how complex it was, and they realized that there was a need to hire a third geologist. This had not been anticipated by the company, but this third geologist would be needed to supervise mining of ore in the pit, ore control or grade control.

At that time, they hadn't really selected anybody for this job, and when I talked to them, they weren't even sure that the job would be approved by Homestake management. In the end another individual was selected for that one, and his name was Dave McClure. Dave was a friend of Norm Lehrman's from the Washington area. I believe he and Norm had worked out of Spokane for a time, so they knew each other, and Dave was more experienced than I was anyway for a position of responsibility like that.

But my name was put on the list, and I guess one advantage I had, too, was that I was a local geologist. Homestake's commitment to hiring local professionals and nonprofessionals alike was very high. So it was an opportunity for me. It was just a matter of time before I got in. When I did get hired, it was in 1985, just a couple of months after I had graduated. I was hired as a temporary. Once again another geological project had come up at the mine that hadn't been anticipated. They had just hired their third geologist, so they were already looked at as having a fairly bloated geology department. But there was a desire to patent some mining claims.

A good portion of the lands that were to be occupied by the waste rock pile, the waste rock dump, were on BLM land, Bureau of Land Management. And it was at that time looked at as being desirable for the company to seek patent on that land to--they had mining claims called mill site claims, that had been staked across this land. So they held possession of it. But it was still BLM land, although Homestake had the right to use it.

As a part of the patenting process that Homestake had decided to do, one of the first steps would be to do a geological reconnaissance. You had to, in the case of a mill site, demonstrate that there was no ore lying within its boundaries. It had to be what's called nonmineral in character. So someone had to do the legwork across square miles of serpentine landscape, presumably barren, no chance of gold being there. But someone had to go out and sample every claim and investigate every one to confirm that there was no ore there. The existing staff of three didn't have the time to do it. And so that's when the suggestion came up, let's hire the kid from Calistoga.

Swent: This is the opposite though, of--usually you're looking for ore, and in this case you were looking--

Enderlin: In my case I was not looking for gold. I had to specifically go out looking across a landscape that had no potential for gold deposits. I don't know what would have happened if I had actually discovered ore out there. [laughs]

Swent: That's what I was going to say. What if you had actually found some gold?

Enderlin: I probably would have been unpopular, since the design for the waste rock pile had already been pretty much cast in concrete in the permits and in the mine planning. [laughs] So I spent that summer--initially it was for two months, beginning in June of 1985, and it was extended for a period of months after that, until finally in November when the wet season came on I was let go. And it was planned. That was to be--it was a fixed period of time.

Swent: What exactly were you doing?

Enderlin: Well, having a lot of fun, actually. Homestake gave me, for starters, as a vehicle--they had no pickups available for me, so they gave me a Honda ATC, a three-wheel all-terrain cycle. This had been used by the Environmental Department.

Swent: A three-wheel cycle?

Enderlin: Yes, it's with big balloon tires. It's like a motorcycle with three big balloon tires on it. And it was the only vehicle that was available. The Environmental Department actually was in possession of it, but they didn't use it that much. It was more convenient to use pickup trucks for their tasks. This was available for me that summer, and that's what I used to go out in the field and collect my samples and do my mapping. That was my primary task, was to construct a geologic map of the area west of the mine, and to collect samples.

We came up with a strategy of at least two samples per mill site, sampling representative rock. If I saw other types of rock that looked like they did have the potential to be mineralized, and perhaps even have gold, I sampled all of them, too. I took hundreds of samples out there.

Mapping the Melange

Enderlin: The geologic mapping was interesting. It had been previously mapped only as serpentine; just a big splotch of the same color. No one had really spent that degree of time and effort in trying to do a geologic map in that area. I was lucky to have come from Sonoma State where we had done mapping in the Franciscan complex. The Franciscan is a local jumble of ocean rock that is--

Swent: Is that the Franciscan melange?

Enderlin: It is melange, a mixture, but it is not Franciscan at the mine. It's Coast Range Ophiolite. It's very complex, very difficult to map. You don't use your conventional geologic mapping strategies when mapping a melange because there are no boundaries to it. It is a jumble of every possible rock type imaginable. One has to look at a technique to make sense out of the chaos. The way one does that is to look at key blocks within the mixture, what the typical rock type is, and then try to map them out and see if patterns emerge.

I applied that technique and it worked. Actually the maps are quite interesting, and they reveal some very subtle differences in the serpentine landscape out there. When all was said and done, my maps weren't actually used for a number of years. When I left at the end of 1985, apparently the patenting process took a low priority, and so the data was filed and not used.

I came back in 1986. They decided that, let's turn this guy loose on some other mining claims to the north of the mine the following summer. That next year I worked, instead of mill sites, these were lode claims.

Large blocks had been staked all around the mine. Homestake had done this as a protective measure since at the time that the claim staking took place, no one knew exactly what the full extent of a McLaughlin type deposit would be, they staked an enormous buffer in all the public lands, all the BLM ground, to assure that competitors wouldn't be able to step in and move in too close to the backyard, you might say, of the McLaughlin Mine.

Well, they had reached a point in '86 where it was time to start looking a little more closely at some of these mining claims. They had been staked very hastily, very quick reconnaissance done to investigate these things, but no detail work had been done. That was my job in 1986, was to go out, and during 1986 I was looking for gold as opposed to the previous year where I was doing condemnation. So I was directed to the farthest reaches of our mining claim blocks in that year, miles to the north on Cache Creek, to the east and west. I had a chance to cover a huge amount of ground in '86.

Swent: Were you commuting up there, or camping up there?

Enderlin: No, actually I returned every day to the office at the truck shop building. The first year they didn't have office space for me, so I shared an office with Norm Lehrman. Then the second year when it was obvious I was going to be more of a fixture around there, they set up a cubicle area out in one of the large open rooms.

Swent: That was in the truck shop. That's down by the mine.

Enderlin: At the mine site. The offices at the McLaughlin project were set up in two different areas. Those that were mine related, the mine engineering, geology, surveying, blasting, operations, and all those mining-related offices were based at the truck shop. The truck shop is a large building which, like the name implies, is primarily a maintenance shop for working on the large equipment. But there's a smaller building attached to the same complex that houses the offices. I was in the geology office.

Swent: Were you commuting from Calistoga, then?

Enderlin: No. I had made arrangements with my distant cousin, Elmer Enderlin, in Lower Lake. In '85 when I first hired on, that was the deal that I made arrangements to do with Elmer. He loved it. He needed that, actually, because every summer he would go to Idaho and leave his house unattended. He had had some bad experiences with renters in the past, and was absolutely thrilled when a family member was going to come in and rent his house.

It was a great arrangement for me and for him. And it was especially convenient for me, because his house, which was located right on Highway 53 in Lower Lake, was directly across from Homestake's Park-n-Ride. And at that particular time Homestake was running buses for all the shifts. It was a simple matter for me to wake up in the morning, have breakfast, and run out the door and across the highway and hop in the Homestake bus. I mean it was literally just a short walk to the bus. The bus would bring us up the hill and return us, so I had a good deal going there.

In later years, when I became a regular staff at the mine, we just continued that rental arrangement. Whether Elmer was at his house or up in Idaho, it worked very well. We had our different areas in the house, and we got along well. Some of the family members were curious to see how this would work out because Elmer is a very dynamic soul, and not everybody could handle being in the same house with this guy.

Swent: And a big age difference.

Enderlin: Big age difference. But the one thing we had in common was the mining, so we always had something to talk about. That has always worked very well for us, and we still like to compare notes on mines.

Swent: Wonderful. And there was a sister next door, too, wasn't there?

Enderlin: It was the brother. Yes, the brother and the sister-in-law. His brother, Lamar, had recently moved down when I moved up there. They had owned this property and put in a mobile home on it and had been living on that property for a few years. They had recently retired and come down from Butte, Montana, to live in Lower Lake. Lamar has passed away, but Lily is still there, living in Lower Lake. She and Elmer kind of take care of each other now.

Mapping and Panning for Gold on Homestake's Claims

Swent: You were hired then to go up to the north, and this time looking for gold instead of lack of gold. Still riding the cycle, the Honda?

Enderlin: I was still riding my Honda ATC. Big Red, as it was called.

Swent: Some people would almost pay to do that.

Enderlin: It was funny that the heavy equipment operators, of course, didn't know me at the time. Very few people did because I wasn't working in the pit. I was always out in the field, and I would only show up at the office at the beginning of the shift or at the end of the shift.

So all they knew of me, and people still talk about it, was at the beginning of the day I'd fly through the pit, through the heavy truck traffic, through the Caterpillar 777's ("triple sevens"). These big 65-ton trucks would be plying along the roads, and here would be this little tiny diminutive motorcycle, the ATC, flying along in the middle of the haul-truck traffic. I think I gained the respect of some of the truck drivers as a result, because they figured anybody that was crazy enough to drive around in the pit with that thing must be okay.

Swent: What were you doing in the pit?

Enderlin: I had to cross through the pit in order to get to the locations where I worked. The main access road going to the north passed directly through the haul-truck traffic.

Swent: There was a road that went through and out the other side?

Enderlin: Well, there still is. We have always called it Davis Creek access road. That was our main--but when it crossed over the ridge, it was simply like a ranch road, you might say, that went down to Davis Creek Reservoir. In order to get there, you had to pass directly through the haul-truck traffic crossing the pit areas. The road has moved through the years. Now it runs across what is called the Barker dump, and skirts along the southern and southeastern edge of the south pit.

But originally the Davis Creek access road passed directly by the crusher, and looped around across what was called Zodiac Hill, right in the middle of all the haul-truck traffic action. I mean all--the crusher and the stockpiles were the heart of activity, and this road passed right through that area. So that was my morning exhilarating drive, going through that traffic. I would always wave, and the truck drivers would wave back. It was kind of our morning ritual to be friendly. [laughs]

I spent a summer doing that. Didn't find any major gold deposits out there, although I did find something very interesting that later on I think helped a lot to understand the geology of--or why the McLaughlin Mine is where it is. I brought my gold pan with me, and using a very traditional low-tech method, [laughs] what I discovered was that there was placer gold, gold particles, in most of the little streams that fed into Davis Creek and Davis Creek Reservoir. Very tiny particles, most of them no bigger than a pin head. But quite a few of them. Every gold pan, you would pan a load of gravel from the local creek, you would find a couple of little minute specks of gold.

After plotting the stuff and trying to sort out where this gold was coming from, since it was obviously of interest to Homestake to find out what was going on with placer gold, it was concluded that it was actually gold that was weathering out of the rock formations directly, not out of gold veins, but instead out of the sandstones that were over in those ridges. To this day we believe that the source of the gold that made the hot springs deposit must have come from those sandstones. It's the most likely source of gold.

You never make new gold. It's only recycling, you might say, in nature, and the hot springs simply created the conditions where gold could dissolve by hot water deep in the earth and be transported to some central location, like a gigantic concentrating machine. The gold has to come from some rock somewhere, and those sandstones are the most likely candidate since they do contain gold, fine particles of gold that we find with our gold pans in those formations.

Those formations are all part of what we call the Great Valley group. The mine is placed directly on a major boundary between two very different types of rock. I mentioned the serpentine that I was mapping to the west. Well, when you cross the mine pit you cross a fault, which is called the Stony Creek fault, into a very different sequence of rocks, which are sedimentary there. They are formed from the processes of depositing sands and gavels and silts that took place in an ancient ocean.

Swent: Sedimentary as opposed to the others where--

Enderlin: Well, the other rock types are igneous and metamorphic, and serpentine falls in the metamorphic category. These are just basic rock types. Serpentine actually would have formed very deep in the sea floor at the base of the earth's crust or in the mantle of the earth, extremely deep-forming rock.

When it originally formed it wasn't serpentine, or serpentinite; it was a rock type known as peridotite. Peridotite is very common, but one thing that causes it to change is reaction with sea water. Deep in the earth it is quite stable, but as it gets nearer to the surface, during the course of plate tectonics, and folding and faulting and uplift, it will react with sea water and hydrate to become the group of minerals that are called the serpentine group. So the serpentine is kind of an end product of that long transport of peridotite from the mid-ocean spreading centers.

The rocks on the east side of the fault where I was finding the gold are part of what was the gravel, the sediment that came off the ancient Klamath Mountains and the ancient Sierra Nevada. These are all formations that go back to the time of the dinosaurs, that go back to the Mesozoic Era. More specifically, the oldest formation is the Knoxville Formation, which is upper Jurassic in age, about 135 million years old. The rocks we were finding the gold in were somewhat younger. They actually were not in the Jurassic, but in the Cretaceous. It would be an interesting study some day to try to determine what the provenance, what the source of that formation might have been. No one has done it to date.

That particular formation that yielded the most placer gold was called the Crack Canyon formation. It was named for a local canyon to the north of the mine. I gather there must have been cracks in the rock up there that inspired whoever named it. That formation seemed to yield the most gold. So that was my earth-shattering conclusion for that particular summer.

Swent: Well, your panning expertise came in handy.

Enderlin: Yes. Yes, it was interesting. In the end we recommended the claims for abandonment, and slowly with each year we reduced the size of the claim blocks to something more manageable. Like I mentioned before, the original intent in staking mining claims was to create an enormous buffer around the McLaughlin Mine, to protect Homestake's interests until we had had more time to investigate the district to determine what exactly a McLaughlin deposit is.

Swent: I think there was the hope, and certainly the expectation, that there would be a lot more of an area, a gold-bearing area.

Enderlin: Absolutely. Nobody knew. It was such a new concept, a new type of deposit: a hot springs gold deposit. It was a new concept, but an old concept. If you look at some of the models, the geologic models that have been put together for the genesis of mineral deposits, you can see that the thought was there, that you could create hot springs. But Homestake really did take a giant leap in going beyond just looking at the models and actually going out and doing a broad reconnaissance program to try to find a deposit that fit that particular level of the conventional models.

The conventional models state that you should see a zonation of metals. In the perfect world, if you were to have the perfect epithermal deposit, meaning a hot water deposit, what you would see is a layer cake, starting at the top, with mercury and other volatile metals. Mercury or quicksilver typically forms very shallow-level deposits. As you go deeper into this ideal model, you begin to see gold. And if you go deeper still, the gold will give way to silver. Typically as you go deeper in these systems, the gold will persist, but there will be much more silver with respect to gold.

So for instance here at the Palisade Mine, you could argue that this would be a deeper type of deposit than McLaughlin, because at McLaughlin, you had perhaps eight to ten times as much silver as gold on the average. Here in this district at the Palisade, it was more like seventy times. Much higher silver than gold, and hence the deeper deposit. So here you're looking at another system in that model. So we're going from gold to silver, now deeper; and again, capping it all is mercury. That's the key to the exploration that Homestake went into.

Below these things you would start to see base metals: copper, lead, zinc, and eventually you get into tungsten and the deepest of the metals that typically occur in this type of model. It was a standard model. It has been around for many years. It was developed long before Homestake took up the lead in exploring for this type of system.

What Homestake did was look at a very specific segment of this model and go out and aggressively explore for it. And that segment that they were looking for was that point where a mercury deposit gives way to a gold deposit. That was where the McLaughlin deposit was found. To the company's credit, by going out and looking, they found something, which is pretty remarkable. When you think about it, that was a big leap for Homestake, who at the time had only one gold mine, the Homestake Mine. To go out and be that aggressive was quite a leap.

Homestake in the Sulphur Creek District from 1926

Swent: Yes, it was. Maybe this is when I should ask you: Who was John Hite?

Enderlin: [chuckles] John Hite came and went long before my time. So all I have on record are his memoranda and his reports. Early on, when the hot springs mercury modeling was being considered, Hite was apparently working for the exploration group, and was asked by Jim Anderson to research all that was known of these models. I have never met John Hite, but I have the records of what he was told to do and what he compiled. It's a wonderful research project. He went out and canvassed all that was known of these conventional models.

Swent: This was in the late seventies?

Enderlin: This was in the late seventies. This was about 1977, and '76 I think. Earlier he had even done some work back in about '71. So this had been an ongoing thing, to research and collect information on the state of knowledge for these types of deposits. And Hite's research--I have his documents--and it's quite thorough, quite interesting. You might say his work was certainly a major contribution to Homestake's decision to pursue the hot springs reconnaissance programs, because it was his collection of information that was kind of a basis for going forward.

Now as I understand it, Don Gustafson, of course, who was the first Homestake individual to set foot on the McLaughlin property, then known as the Manhattan--Don had been working at Bodie, and so Don had experience with regard to Bodie-type systems. And Bodie is a cousin to this. It's another of these epithermal-type systems. He had the field experience to investigate in the field this type of a system.

One thing that's unusual for McLaughlin--we know it now; at the time we didn't--is that it's probably the world's best example of a perfectly preserved cap of an epithermal system. Typically a hot springs weathers away very quickly in the geologist's sense of time. So in the matter of tens or hundreds of thousands of years, which is a blink of an eye for a geologist, the cap is long gone, weathered away. That usually happens because the cap over these systems is strongly chemically attacked and usually converted to clay. And clay just washes away. We can see it in our lifetimes how quickly a clay can erode away. So you can imagine in the geological sense how rapidly you can erode away the top of a system like this.

The McLaughlin deposit was extremely unusual in that it still had preserved at the surface the hot springs sinter. These were the ancient terraces where the water that would have flowed upwards through these fractures in the rock would have flowed out onto the landscape. And these are preserved. And the sinter--looking at its textures, looking at its content, there was no question that it was a surface deposit. It was formed by the hot water as it emerged. Therefore it gives you a datum. It says this was the original surface one million years ago. That made McLaughlin very special, and one that has few, if any, rivals in the world.

In terms of finding the top of the model, that one little window that Homestake was looking for between the mercury zonation and the gold, what better place to find it than McLaughlin. Homestake was inspired to look in the Clear Lake area by previous experiences to the north. The first Homestake active exploration using this model was not at what's now McLaughlin, but farther to the north about fourteen miles in the old Sulphur Creek mining district.

The decision to move to Sulphur Creek was again based on what was available in the files. Homestake had investigated that district in the 1920s, in 1926, and so it was the files that had been created during that 1920s period and placed in archives that lent themselves to follow-up investigations in the 1970s. The story of the discovery of that district, and the files that were created are really a key part of the Homestake history, because they bridge the gap between the old Homestake Mine and the California operations.

Nineteen twenty-six was a very important year. You have the first geological department organized at the Homestake I think starting about what, 1919. The company was looking for more ore. They were running out. Enter Dr. [Donald H.]

McLaughlin, who ultimately saved this company's bacon, you might say, by identifying the true nature of the projection of the ore bodies, as well as introducing more sophisticated mining techniques, cleaner mining techniques. That was during a time when Dr. McLaughlin's achievements hadn't happened yet, and so the company was looking. In 1926 they sent an engineer out to investigate one of the mines in that particular district, the Sulphur Creek district, which was the Cherry Mine. And that name stuck, even though in the twenties the final report concluded that, yes, there's a resource there, and in the end Homestake didn't bother to act on it.

The Embarrassing Cherry Hill Project, 1977

Enderlin: When they pulled the old file, that project became known as Cherry Hill. Cherry Hill, when you speak to some folks in Homestake, they will grimace. While if you speak to others in Homestake, they will smile and say, yes, that was a neat spot. Because had it not been for Cherry Hill, Homestake wouldn't have found McLaughlin. At the same time, Cherry Hill was a big embarrassment for Homestake.

Swent: Why is that?

Enderlin: Because we learned early on, before many of our other competitors did, how to explore and drill in deposits that are very wet. The original exploration drilling that was done at Cherry Hill around '77 and '78 was done rotary. Rotary drills as opposed to core drills are very fast, very cheap; they generate a big sample, and actually in terms of drilling, it's a real quick way to identify a resource very rapidly.

We used a lot of drills at McLaughlin in later years of the rotary type. One caveat in using a rotary drill is that under wet conditions in rock formations such as we have, you can concentrate the gold. If you think about the type of rock that we have--I've mentioned the serpentine and I've mentioned the mudstone, the Great Valley group rocks. Well, the mudstone is a very common type of rock within the Great Valley group, especially in the formation called the Knoxville formation, which occurs at both McLaughlin and Cherry Hill. Mudstone, being a softer rock, will tend to churn and wash and flow away as a mud in a rotary drilling system, leaving behind concentrated bits and pieces of quartz, the stuff that carries the gold. In both these deposits, the gold is not disseminated. It is specifically in veins that cross-cut and slice through these other rock formations. So if you think about it, if you have a sample that should contain a mixture of quartz and the surrounding rock, if your drill is actually washing away the surrounding rock, you're concentrating the quartz, and hence you're concentrating the gold.

Well, Homestake discovered that fairly late in the game at Cherry Hill. At some point during the course of exploration, after announcements had been made, after the momentum had gathered to move the Cherry Hill project towards being a viable mine, someone decided to come in and diamond drill, using core drills, to compare some of the rotary results. And the results showed that wherever a rotary hole had been bored, and a core hole, or diamond drill hole, had been bored next to it, the results didn't match well, that the core was typically consistently of lower grade. And that would be consistent with that flaw in rotary drilling techniques, what we called "panning," literally. Your rotary drill is acting much like a gold pan, washing away the barren stuff, the fine stuff, and concentrating the goodies. So very late in the game, Cherry Hill took on a very bad name for itself. There are many in Homestake who remember that dark period in time.

Swent: Who told you all this? Because you were not there at that time.

Enderlin: I was not there at the time, but it was told me by a number of folks who had been involved. Norm Lehrman certainly was aware of it. He had heard about it from others in the company. Jeff Wilson had had close ties with the people that were involved in there. Plus a number of the geologists that had worked at Cherry Hill were still working for Homestake when I was hired on. And so through word of mouth it became fairly obvious what had happened to Cherry Hill.

When I was hired on with Homestake, there was a terrible stigma of that mining district. We had been recently burned by it. It was an ugly period. I mean, to accept the fact that we had miscalculated an ore reserve or a resource estimate at that time, was a very ugly situation.

Ironically, in later years, and not that long ago, other mining companies have suffered a similar problem on a much larger scale than Homestake. It's probably fortunate that we got it out of our system early in the game. Echo Bay's McCoy-Cove deposit is probably the most notorious for doing the same thing. Unfortunately, in their particular case, the Cove deposit had literally reached the point where mining was ready to begin, when someone discovered that the rotary holes were overestimating the resource.

Swent: Where was this?

Enderlin: This is in central Nevada. The McCoy deposit had been an existing open-pit operation. This recent extension of their ore body had just recently been found, and there was a great deal of excitement. I have owned Echo Bay stock for many years, and it's an interesting part of my collection to see the annual reports of the McCoy-Cove deposit, and the excitement leading up to developing it, and then the last annual report that deals with it, talking about, literally a public apology to the shareholders, and describing, using graphics and all the things you need to do to educate people who don't know anything about drilling, of what had happened. Their mistake was on a much larger scale. It's one of my most interesting annual reports that I keep in my collection, this huge chapter within the annual report dedicated to explain to the shareholders why the Cove deposit isn't as big as we thought it was.

For Homestake, we can look back and say well, yes, we learned our lesson early on, on a much smaller deposit, and fortunately we were able to make a good thing out of it by discovering the McLaughlin deposit in the end. We did try hard to make a mine out of Cherry Hill, not just in the late seventies, but on up into the late eighties, and never could. There were probably three successive periods after the 1978 drilling program that we went back to Cherry Hill to try to understand it. Every time we went, exploring different concepts, different ideas, and finding a bit more resource, but never enough to make it into a mine. It's still enigmatic that that deposit has seemingly no root. Very high grade at the surface. You can chip away at the gold veins there and see gold with the naked eye; it's much coarser than at McLaughlin.

At McLaughlin, in the original outcrops, the gold was generally microscopic. The coarsest gold that we saw in outcrop, which was on a spot called Quartz Adit Hill, required a hand lens in order to see it. You had to have magnification of about 10 power just to see the wispy little flakes of gold, the dendrites of gold as we call them. So Cherry Hill was a very tempting deposit, and very frustrating to not be able to build a larger resource than we did out of it, especially seeing so much coarser gold. But Cherry Hill was also a deposit that didn't have all the earmarks of McLaughlin. It was a smaller deposit in its dimensions, it was not as high grade, and there were fewer quartz veins in it.

One thing that made McLaughlin exceptional was the multiple generations of quartz veins that cross-cut each other: successive events. Each vein represents a fracture in the rock that was opened up by fault activity, or pressures from the hot water, to allow water to flow through it. As water flows through these fractures, it gradually builds up crusts that fill it in, much like hard water in your pipes at home if you're unlucky enough to have it. You have to have a fairly active or very violent system in order to make a big gold deposit.

Cherry Hill showed signs of several events where the rock fractured and filled with quartz, but only several, compared to the dozens or hundreds of events that took place at McLaughlin to create such a large deposit. Each time you have a new generation of cracks to fill, you create a bigger gold deposit, a bigger, richer gold deposit. So McLaughlin was at a place where all the variables that were needed were met. You had a constant cracking to keep the system open, keep the hot springs flowing, and so the deposit just grew larger and larger until eventually it became a world class gold deposit over the course of its formation.

In the end we did have to relinquish our interests at Cherry Hill. Homestake's interests included mining claims, unpatented mining claims, leases, which were by far the largest percentage of our total landholding there, and direct ownership. We did own one property called the Bailey Minerals property. The leases were primarily some of the surrounding mines. There were actually several mines in the district. The Cherry Mine was just one. The Manzanita Mine is the most notable of the mines in the district, and it was located on the Bailey Minerals parcel. So we owned that one directly. The West End Mine was partly on Bailey and partly on another property owned by Bonneville Industries. Finally another mine to the south of us, which we also held a lease on, was the Wide Awake Mine. Two words.

Swent: I love these names. Is the Manzanita the one that's at Wilbur, up by Wilbur Hot Springs?

Enderlin: Yes, all these mines are located near Wilbur Hot Springs. In fact, Wilbur Hot Springs, the hot water itself, which is still flowing out of the ground, still is depositing gold. It's kind of an interesting little example of the processes occurring today. A black residue that builds up in the base of these springs was sampled by one of our graduate students one year and found it contained very high concentrations of gold. So these precipitates, these residues that are coming out of this water, are ore-forming fluids. You might say, they're making gold in real time. Horrible looking water. During the summer months when there's not much rainfall to mix with it in the creeks, the water flows black. Just black as ink, and the black color is primarily due to sulfide minerals, which are precipitating out of the water in these hot springs.

Most people in Homestake will know of that property as Cherry Hill. Certainly in the old exploration days that is the name that was known, and the name by which it was hated. More correctly we refer to it as Sulphur Creek. In later years we actually did our exploration, at least the last period of exploration was done, under the guise of Sulphur Creek exploration, simply because Cherry Hill had that stigma attached to it.

Swent: Bad connotations.

Enderlin: Bad connotations. So everyone knew what that one was. We tried hard to make a mine out of it. And it will continue to be frustrating to realize that we were never able to find it.

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Enderlin: To wrap it up on the Sulphur Creek Mining District. That one is also interesting historically, in that it is the oldest of the gold districts of the Coast Ranges. The California Geological Survey that was organized in the early 1860s came through this region and reported in 1865 their findings.

The California Geological Survey of 1865 Finds Gold and Mercury

Swent: Was that Brewer?

Enderlin: This was William Brewer. And actually the head of the geological survey was Professor Josiah Dwight Whitney. If you look at all the names of the people in the first California geological survey, it's a who's who of the grand old people in geology and botany.

In the 1865 report, Professor Whitney mentions that a curious piece, a sample, had been shown to him in the Clear Lake region as they were passing through, that consisted of gold and cinnabar encrusted together. He never investigated the site directly, but he made note of it in his official report. He described the locale from which this specimen had been collected as being on the road between Clear Lake and Colusi, which we now call Colusa. That would have been the Wilbur Springs area, the old Sulphur Creek mining district.

They were mining it in the 1860s for gold actually, fairly crude operations at the time. You find in that district that there were periods where it was more lucrative to process mercury than the gold. They tended to vacillate back and forth, depending upon which metal was the highest economically to process at the time.

Swent: This was just at the time when they began using mercury for amalgamation, wasn't it?

Enderlin: That's correct. It would have been at a time when in the northern Coast Ranges, north of the Bay Area, there was enormous activity as mines were being developed, to accommodate the Mother Lode and the Comstock Lode. Especially the Comstock Lode.

The Comstock had been discovered in the winter of 1859, or I guess that summer. With the advent of the Comstock development, there was an enormous need for more quicksilver, local quicksilver, which couldn't be produced to meet the demands strictly from the New Almaden Mine to the south of us. So the mines in the northern Bay Area were developed very rapidly to accommodate that need.

As the economics changed, this gold mine, which had been there and had been mined for gold, shifted over and began to mine for mercury. You find through the course of the decades there were periods of boom and bust, where they shut down; new management would come in. I'm talking now, the Manzanita Mine, specifically. You find that depending upon the whim of the moment, they mined for gold or mercury, but one thing that is clear is that they officially produced gold earlier than any other mine in the Coast Ranges of California. The only other one that would go back to near that period of time would be to the south in the Los Burros area in Monterey County, and the Palisade Mine, here in Calistoga. The Palisade and Silverado Mine--Silverado dates back to 1873, 1874 in their heyday.

The Calistoga/Silverado and Palisade Mines

Swent: That's the one that Robert Louis Stevenson made famous.

Enderlin: That's correct. It's located on Mt. St. Helena, just north of Calistoga, and just before you step into Lake County. All these mines are on ore bodies that are very, very similar, close cousins, to the McLaughlin Mine. They are in many cases much smaller, and most of them are the result of processes that formed in slightly different conditions: smaller faults or less active faults, water that was hotter, water that was cooler; the conditions just weren't quite the same, so these are smaller deposits. The Silverado Mine is a very early attempt to mine gold and silver economically in the Coast Ranges as well.

So McLaughlin is a part of the history. You have the Cherry Hill, what was then the Sulphur Creek Mining District, producing in the 1860s. You have the Silverado, which was then called the Calistoga Gold and Silver Mine, producing in the 1870s, up to about 1875. They ran out of ore and shut down. Then you have the Palisade Mine, and the Palisade Mine ranked as the highest producer of precious metals in the Coast Ranges up until McLaughlin, so our backyard mine here in Calistoga has been eclipsed by the McLaughlin production.

The Palisade began operations in 1887, and continued until about 1892 when they shut down due to the poor economics of silver, and also because the owner, Gribsby's son, was killed in the mill by the open belts.

Swent: Oh, my.

Enderlin: We look at our safety regulations in our modern mines, and look back in the old days, and you realize why those regs are in place.

Swent: What kind of mill was it?

Enderlin: It was a stamp mill with open belts. It was the open belts that killed the boy. He was working for his father in the mill, and got caught by one.

Swent: Oh, how awful.

Enderlin: The stamp mill was actually the same stamp mill that was used at the Calistoga Gold and Silver Mine. When that mine shut down, Grigsby, the owner of the Palisade, purchased the equipment and had it hauled down from Mount St. Helena to be reinstalled at his mine. So the legacy of Silverado, the Calistoga Mine, continued at the Palisade.

Swent: Where were the belts?

Enderlin: The mill was built in the traditional gold mill style, with multiple levels, using gravity, but there were elevator systems, things that required mechanical movement of ore. They had a steam boiler that powered an engine, which in turn ran shafts to move these different mechanized moving pieces of equipment within the mill. In order to transfer the rotation from one shaft to another, you had an open belt, and the idea of guards just wasn't considered back in those days. It was a very sad deal, and they were fighting very difficult economics in the early 1890s anyway.

Swent: In 1893 was the big crash.

Enderlin: It was the big crash, and so the economics of silver were looking ugly before then. It was at the point where they were just barely making a profit, and of course the son's death was the ending of the whole thing. Palisade Mine did reopen in the twenties, though, and actually continued to operate until World War II, so it had a fairly long period of production. Not a very big production, but considering at the time, a 200-ton mill was pretty big stuff.

Swent: Where did they ship the concentrate; do you know?

Enderlin: Like all mines, and McLaughlin is the same way, if you look over the course of its history, they were constantly changing and improving the way they did business. The earliest mining that was done in the 1880s, was done using pan amalgamation, where the gold and silver were extracted directly on site and poured into bars.

Pan amalgamation is a technology that came about in the Comstock Lode. The pans were big cast iron vessels with large revolving boots, heavy, heavy mortars that ran around in a circle much like the action that you see in the old Mexican arrastra. The object was that the pan, once the ore had been pulverized by a stamp mill, the pan would grind the ore a little bit further, a little bit finer, and mercury would be added to the pan, and the pan would be heated. They would also add salt, and the process basically would reduce the silver. Very interesting metallurgical aspects of Washoe pans, as they call these things, a technology developed in the Comstock where there was very little water. This was a dry process of silver extraction.

Basically this grinding action of the pans would do two processes: the heat and chlorine generated from the decomposition of the salt would reduce the silver to elemental silver, which in turn could be amalgamated--mixed with the mercury, basically. Then from there the mercury sponge could be collected and sent to a retort where the mercury would be driven off and recycled. The remaining mixture of metal made up of gold and silver could be poured into bars, dore bars, just like we pour at McLaughlin. That was the old-style technology that was the way business was done in the Comstock, as well as here up until the advent of the cyanide process. Of course that process was just beginning to be considered when the Palisade Mine shut down for the first time in the 1890s.

The early work, the CIP [carbon-in-pulp] process, and all those things that came later, were largely developed by Homestake Mining Company, and certainly were much more efficient processes. In spite of the terrible name of cyanide, cyanide is actually a chemical that's far easier to work with than the mercury, which is much more dangerous and much more difficult to contain and to handle safely. I think the industry quickly learned that given a more efficient, safer process, the mercury ran its course and it was no longer used. So that also affected the local mercury mines here. When you look at the history of the Knoxville Mining District, and you look at all these other mercury mining districts in the Coast Ranges, you see that that was a big turning point for mercury mining, when the need for mercury in the old gold and silver mills was no longer there.

From then on it was other necessity, war time, to manufacture mercury fulminate, or in the very latest period, battery manufacture, looking at the Mallory mercury-cell battery as being a period in time when that battery was developed, that there was a spike in the demand for mercury, and hence a resurgence of mining in this region.

Getting back again to the Palisade Mine and its processing technology: that was the old technology, which in 1892 ended. When they shut down, that technology was on its way out. When the Palisade Mine reopened in the 1920s, there was much improved technology, cyanidation; they used cyanide process initially. In the thirties they ended up no longer treating their ores and extracting the gold and silver directly on site. Instead they concentrated using flotation.

The flotation process is basically a bubble bath set up to concentrate sulfide minerals. Most of the minerals that carry the gold and silver are what are called hydrophobic: they resist water, and so if you create this froth-type action where air bubbles are passing upwards through this pulverized mud of ore, the ore particles will attach themselves to the air because they prefer to attach themselves to a bubble of air than to the water itself. That process is used to concentrate sulfide minerals.

What they generated in the thirties, and up until World War II, at the Palisade Mine, was this concentrate of all the sulfide minerals, including the ones that carried the gold and silver, which was then shipped down the Napa Valley to the East Bay, to the Selby smelter.

Swent: How did it go to Selby? Was there shipping from Napa?

Enderlin: It was a pickup truck in those days. There was one gentleman--somewhere in my files I've even got his name--who drove truck down the Valley with loads of ore concentrate. The original--it probably has changed over. There was a railroad terminus here in Calistoga, and certainly in the days when they were shipping the bars, the bars were all shipped out by the railroad through high security, to where, I don't know. They would have had to be further refined, presumably to San Francisco, would have been probably the nearest refiner at the time.

The Selby smelter was very very efficient in processing the ore concentrates here. Selby's background was initially as a lead shot plant, and they still processed large amounts of lead ore in their smelting operations. One thing, in a smelting environment where you're heating an ore up to high temperature, and you're melting lead, molten lead has the same properties as quicksilver does. It will want to amalgamate with precious metals. The difference between quicksilver and lead, of course, is you can work with quicksilver at room temperature, where lead scavenging of precious metals can only occur under high heat in a roasting environment. For the local mining companies, it was to their benefit to send to the Selby smelter, because the lead processing that was done enhanced the recovery of the precious metals from their ores. They could recover far more at Selby than they could by processing the ores on site. There was an interesting little symbiotic relationship that went on between that particular smelter, and certainly the Palisade Mine here in Calistoga.

Swent: That is interesting. Because you always think of Selby as a lead smelter. That's what it was called, I think, in fact. It was a lead smelter.

Enderlin: That was from the very beginning to the very end their primary product.

Swent: And what got them into trouble.

Enderlin: Yes, yes. They custom smelted for a variety of mines throughout the state.

Swent: From all over the world.

Enderlin: Yes. Yes, throughout the world. Absolutely.

Swent: South America--from everywhere came to Selby.

Enderlin: Yes. I don't know too much about it, but there were apparently at least two other smelters in the East Bay that were also used on a couple of occasions for the Palisade Mine.

Swent: I think there was one in Alameda for a while, wasn't there?

Enderlin: Yes. Copper King had one, and there was another one, I forget the name. Actually one test lot for Palisade Mine ore was shipped clear up to Kennett in Shasta, the Lake Shasta area. The town of Kennett was an old copper mining town. It's now under Lake Shasta. They had a smelter there. At the time they formed some sort of a contract with the Palisade to run a test shipment of ore there to see how it would perform.

Wages and Benefits at Homestake

Swent: Well, perhaps we should get back to the McLaughlin now, but it's all right; this is all very good.

Enderlin: Well, it lays some of the groundwork in the region for it.

Swent: Right, it does. We had left you when you were just exploring to the north. What was the result of that?

Enderlin: Well, eventually I reached the point where I had covered sufficient area, that there really wasn't much need for me to continue on.

Swent: Who hired you? What was the hiring process actually like?

Enderlin: Well, of course I wasn't privy to all the arguments that must have transpired.

Swent: There was this temporary job that you had first.

Enderlin: Yes. Yes.

Swent: And then you were not working for a few months, I take it?

Enderlin: Yes. I was back on the ranch at that time. And there was some talk that there might be an opportunity to come back again the next summer, so even though I was laid off, I knew that there was a chance I would be back. By that time I was kind of eager and receptive to coming back.

Swent: Did you keep calling them?

Enderlin: I kept in touch with Norm Lehrman, but didn't assert myself too much; keep showing up as a pest.

Swent: He was the one that actually--

Enderlin: Norm was the one, and Norm was a wonderful boss. I always think very highly of Norm. He fought very hard to get me hired on, and took very good care of his department. Norm's biggest contribution for our department was the fact that he was so inspiring. I think anybody who has met Norm Lehrman, once you hear him give a talk, you're all fired up and all ready to go off in the hills and go prospecting, because that's Norm's way. He's excellent at delivering the sales pitch, you might say, to get people going. That same enthusiasm certainly pervaded the department; he made it interesting, made it fun. That really was a wonderful entry for me into Homestake.

Swent: How much were you paid?

Enderlin: [chuckles] When I was first hired on, my salary would have worked out to about $18,000 a year. Looking back, that was fairly low, but I was a temp, and temps came in at the lowest wage.

Swent: Were there benefits?

Enderlin: Yes. That was one thing that they were very good about. They did, even though I was a temporary, I did accrue benefits from the very beginning, and so it worked out very well.

Swent: What kind of benefits were there?

Enderlin: It would have been the health benefits; medical, dental. I was salaried then, so I was also subject to accruing towards the retirement plan with Homestake. Of course at that time I had no hope of being vested, so it wouldn't have worked.

Swent: Where did you go for medical care? How did that work?

Enderlin: The Clear Lake area was where we had our doctors. Actually at that time my doctor was here in Calistoga, but it has changed through the years pretty dramatically. I actually, unlike a lot of folks, I think I have under-utilized the medical and dental. I'm sure Homestake is pleased with someone like me who never takes advantage of it.

Swent: Probably. Dental care was a little bit unusual at that time, wasn't it? That was kind of special.

Enderlin: Yes. And actually I think things have changed. It may be that the dental care came a little bit later on. I'm trying to remember how the benefits have been adjusted through the years. But it's a very competitive--I mean, the benefits that one receives are quite spectacular.

Swent: So then you were laid off, and then rehired this time by the--

Enderlin: Still temporary. In 1986 when I came back, it was still as a temporary geologist, with the understanding that there would be a fixed period in time where I would be employed. And that's again where Norm stepped in. He began to turn me loose on other projects. As the field-related stuff began to wind down, he began to move me into other activities, like ore control out in the pit. I finally got to the pit after all that time--two summers--I finally had a chance to work in the pit. It's kind of strange to think of working at the gold mine and I had very little exposure there.

The initial plan that he had for me was to cross-train me so that I could step into ore control as needed when Dave McClure, our regular ore control geologist, went on vacations, took time off. Because at that time there was no one else who was trained to step in to fill that void, and the ore control was such an important part of the mining that you couldn't simply leave it unattended while someone went on vacation.

Ore-Control Geologist, a Vitally Important Job

Swent: What did that involve?

Enderlin: Well, the McLaughlin deposit is very complexly laid out. Nature wasn't kind in terms of making it easy to mine the deposit. You can have extremely high grade, highly-concentrated gold ores, lying literally within a few feet of absolutely barren rock.

Our procedures that we use to analyze all the cuttings from every blast hole give us a good estimate in the field of where the highest grades lie, but you can still, without care in mining and without being able to visualize where those boundaries are, dilute the ore going to the mill, and the one thing that has been a rule from the 1860s to the present, is: you don't run waste rock through your mill. Some things never change. Dilution is your enemy.

It doesn't take much calculation to realize that if you can have a person out there helping the heavy equipment operators to recognize those boundaries between ore and waste to minimize dilution, that that position can pay for itself very, very quickly. Sometimes within a matter of days an annual salary can be paid, basically. I think of some of the biggest decisions that were made, we had some problems with blast hole patterns. It was literally hundreds of thousands of dollars in company expenses that would have been incurred had we not been there to make those adjustments. That was on a day-to-day basis, so it was a vital role at McLaughlin. It was one that initially, when the original staffing plans had been drawn up, apparently was not considered. It was felt that the chief geologist and the senior geologist could have covered all those things. And it turned out to be too much, too labor-intensive for just two people to handle, especially when they were involved with other administrative functions, as well as exploration.

So that was my introduction into the pit environment, working with Dave McClure. Dave was, is, a very soft-spoken gentleman, very pleasant to work with, and he and I got along fine. I spent a lot of time shadowing him and learning the ropes.

One thing that ultimately led to Dave's departure was probably my presence. In good terms, though. I received a phone call, I think in 1987. This was after actually I had been approved to become part of the regular staff, and I was working in ore control. Norm was trying to rotate Dave into pit mapping and other functions to give Dave a little more experience in other aspects of the mine geology. I received a phone call from Salt Lake City from a headhunter: a headhunter being a recruiter looking for geologists. Somehow my name had already gotten out. I had only been working in ore control for a matter of a few months, and my name had gotten out in the industry, and I was called.

At the time there was hiring going on in Southern California at the Coliseum Mine. I felt--and this was an interesting opportunity that could develop for someone. It actually was an opportunity that could lead to a chief geologist position. I just was not ready for that responsibility; I was way too green, and I knew it, and it would have been foolish for me to even consider going after that position. I told this headhunter that, and at that point in the conversation, the headhunter, as most do, said, "Well, do you know anybody on staff who might be interested?"

And I told him, Dave McClure. It was a wonderful career opportunity for Dave. He considered it, and accepted the position, and transferred to Coliseum, so that moved me into full-time ore control. That was Dave's departure. Dave left in April of 1987, early on that year. I hadn't been with Homestake very long.

The McLaughlin Geology Department

Enderlin: So that left Norm Lehrman, Jeff Wilson, and myself as the Geology Department. Now there was another person waiting in the wings. It was kind of the--in later years where I moved to the Environmental Department. Well, this other person was in the Environmental Department and desperately wanted to get into the Geology Department. That other person was Peter Schwarzer. Pete worked for Ray Krauss. He was Ray's right-hand man, basically, to do all the field sampling; to do all the stuff that's necessary for the environmental programs to assure compliance. Pete was a geologist by background and desperately wanted to get into the Geology Department.

Norm was faced with a bit of a dilemma here. Because he didn't want to lock horns with Ray, but at the same time he knew that Pete really wanted to get into the Geology Department. There was an opportunity to move Pete across in light of the staff reduction that we had had, so it was kind of an opportunity that we had to go with. I have no idea what sort of conversations Norm and Ray may have had, but I suspect that they had to do some serious soul-searching to make this happen. So anyway, Pete Schwarzer came into the Geology Department also in 1987; he came on in May, only a month after McClure had departed. Happy as could be. This was Pete's big chance. He finally got into the department.

That brought us back up to four again in the Geology Department. The way we assigned the tasks, Jeff Wilson was in charge of exploration; Pete Schwarzer dedicated most of his time to pit geologic mapping--

Swent: Was this exploration there within the ore body?

Enderlin: Within the ore body. Yes, at that period in time the exploration in and around McLaughlin was fairly tightly divided between Homestake's exploration group based out of Sparks, versus our in-house exploration. The in-house exploration was limited almost exclusively to the pit proper, whereas anything in the surrounding lands was still under the authority of the exploration group. That's something that I think you'll find in any mining company; operations versus the exploration group. There's always a dividing line.

Swent: Always touchy, isn't it?

Enderlin: It is touchy. I certainly got a chance to experience it. I think in later years actually that wall between the two groups kind of melted away, and it was not so apparent as in '87 when it was very, very strong.

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Swent: You were now one of four people.

Enderlin: And working directly in the pit, at that point. The exploration group was active in the area. In fact, at that particular period of time, there was a trailer that was set up that was their office space, located near the core shed. The core shed is on the Lake County side of the property, one of the, I think, the original building that Homestake constructed prior to development of the mine. That trailer was their base of operations. A number of geologists were working there. Two that were there the most were Richard Histed and Bob Hatch.

Swent: These were from the Exploration Department.

Enderlin: Yes. These were from the Exploration Department, and those are names that you'll see in some of the older work.

Swent: So they were getting their orders from Sparks [Nevada].

Enderlin: From Sparks, from Don Gustafson. They reported directly to Don. They were doing concurrent exploration in the region, and around McLaughlin. They did have a diamond drill. Rich, especially, Rich Histed, was especially active in and around the McLaughlin Mine pit. I got along very well with both those guys, although there was friction between Norm Lehrman and Don

Gustafson. In spite of our bosses, I think we "lackeys" did well.

Swent: That often happens.

Enderlin: That distinction between exploration and pit operations was certainly there at that time. Now my function in the pit was basically carrying on what Dave McClure had established. It was a trial-and-error process to work out the details of how to implement ore control at McLaughlin. Every pit is different. The equipment would be different from mine to mine, so you can't apply the same techniques at one pit that you would apply in another.

Dave had established a very, very thorough and complex program for ore control purposes. He had served also in another role, which I think for the purposes of the general operation of the mine was a useful one and a needed one, and that was to bridge the gap between operations and mine engineering.

Swent: Is that possible? [laughter]

Enderlin: This is another one of those historical traditions, that there must always be a difference in values between mine operations and mine engineering. Dave McClure, who reported to Norm Lehrman as an independent third department, would bridge the gap between Tim Janke, our chief mining engineer, and Steve Drake, our head of operations. He was basically the guy who oversaw directly the operations in the pit. Together all three of them reported to Mike Attaway. That hierarchy changed through the years, but that was the reporting structure at the time when I was first hired.

We had those two ends of the haul, Steve Drake and Tim, and both had reasonable concerns. From a pure engineering perspective, you wanted to mine on certain schedules, certain benches, in a certain manner. From a practical operations perspective, if it's pouring rain out, or if something has gone wrong and you've had equipment broke down, or whatever, you may not be able to do it that way in order to keep the tons flowing through the mill. So both of them had valid concerns and valid priorities that were balanced, I think, by the presence of the ore control geologist, because when I stepped in there, that's the first thing Dave McClure told me, is now you're going to have to deal with this.

Swent: You're the man in the middle.

Enderlin: You have the infinite force at one end of the haul, and the immovable object at the other, and you're the one in between. I think that was a very beneficial part of the role of the ore control geologist, was to communicate between these two semi-polarized parties. [laughter]

Of course in the field itself the ore control geologist had a very interesting function, and one that I really enjoyed; and that was to work directly with the heavy equipment. To this day I still find it very, almost awe-inspiring to work around such heavy, powerful equipment. The ore control geologist in those days had an interesting role, where you were literally on the ground walking around in the midst of haul-truck traffic. You wore your orange vest, and you made it very clear where you would be.

There were no radios at that time; in later years we installed radios in all of our equipment. The ore control geologist had a hand-held radio like a walkie-talkie to communicate with other staff in the truck shop or in the administrative offices, but none of the equipment operators had radios, so we had this system of hand signals, and it was quite an elaborate system. It was not anything that would match conventional sign language; it was specific to ore control. There were signals for ore, signals for waste, signals for hard rock, signals for soft rock, signals for the toe of a bench, signals for the crest, just an elaborate hand system, and we still use it to this day. There's a number of the operators who are working in the stockpile right now, a number of them were here at the beginning.

Swent: Is it written down anywhere?

Enderlin: There was an ore control manual written down, but by then we had already graduated to radios, so that was no longer necessary. Waste rock, you would touch your fingers to the tip of your nose as if something smelled bad, and that indicated waste. You could point to a given rock, put your fingers to your nose, and that would communicate the type of rock.

Ore, you would give the "okay" symbol, taking your index finger and your thumb, putting them together and giving him an A-okay, everything's fine. Toe, simple enough, you point at the toe of your boot. Those were the systems that we used. I think there were a few other signals that I never did grasp that the equipment operators would try to communicate. Hard rock, you would knock on your hard hat with your clenched fist, to indicate hard rock ahead. For the loaders that were digging at the face of the ore, they were always concerned over hard digging conditions.

Swent: I thought there was a system of colored flags.

Enderlin: Well, the colored flags were there, and that was something that we had to come up with as a plan. Ore and waste simply didn't cut it in terms of the degree of detail that we needed to communicate with the operators. We did use a colored flag system from day one. Even in the pre-mine period where stripping was going on, some ore was encountered, and it was defined by pin flags. The pin flags were about two foot in length, made of a thin wire, with probably about a three-inch-by-three-inch square colored plastic flag. We used a color spectrum, a rainbow-colored spectrum, with hotter colors like pink and red indicating higher-grade ores, and cooler colors like green and blue indicating lower-grade ores. White always denoted waste rock, so wherever you saw a white flag you knew that you were in barren ground.

The flags were placed by the survey crew after every blast pattern, and their placement was very precisely controlled. The different areas, different patches of different color were bounded by stakes; about three-foot-tall lath would be pounded into the ground, and pink ribbon, just a real thin, easily portable-type ribbon would be strung between each post to create a geometric shape. Not real bulky ribbon, since you went through miles of the stuff; we had to carry it with us out into the broken rock.

What the equipment operator would see in the field would be this series of stakes marking the corners of this ore block, this geometric shape, that defined a given zone of grade and ore chemistry. It was more than just determining how much gold was in the rock. Because of the autoclaves that were very sensitive to sulfide content and carbon content, as well as the gold grade, we had a fairly elaborate system of defining different types of ore and staking those with the appropriate color in the field. What the equipment operator would see then would be this sea of different colored flags, the stakes in the ground, the pink ribbon strung between the stakes to outline the blocks, and then they would be given a map showing the outlines of all these ore blocks ahead of them.

One of the functions of the ore control geologist was to update that map to always show the current mining face. We would mine in pit benches twenty feet at a time; a vertical 20-foot cut was made, because that was the optimal height for the loaders.

Swent: How big were the loaders?

Enderlin: They're Caterpillar 992C loaders. Horsepower rating, you would have to look up. The buckets were capable of scooping 20 tons of rock per bucket load, and they would fill the Caterpillar triple sevens, which would haul on the average around 80 tons of rock. In later years when we purchased hydraulic shovels, we added sideboards to the triple sevens, the haul trucks, and then they could carry up to 100 tons if they were heavily loaded.

Swent: So this is a decision--obviously they picked up everything, but the decision was where to put it?

Enderlin: That's correct. Yes. One of the nightmares of McLaughlin ore control and engineering was the complexity of our ores and the multiple types of ore. If you look at the stockpile that we're mining today, that stockpile was known as the green stockpile, and in that spectrum of color codes, green was the lowest, coolest color on the spectrum. The average content of the green turned out in the end to be about 0.056 ounces per ton of gold: very, very low grade. Yellow, which was the next notch up, was in the 0.06 to about 0.08, 0.09 category. Red typically was around 0.1 ounce per ton. Pink, we changed through the years, but in general the pink was 0.15 ounce per ton or higher. Through the years we added different colors depending upon what types of ores we were facing. But that was the general universal coloring scheme.

Swent: I'm trying to get this straight. You had your surveyors, like Della, people like that, Della Underwood, whom I did interview, going out into the pit. Where did you come into this picture with the operator and the surveyor?

Enderlin: Well, you almost have to go back to the initial planning for a given bench. Again, we mined the pit in benches, twenty feet at a time, peeling it back like the skin of an onion. Each bench would be planned out, and the general location of ore would be known or estimated based on the results of our exploration drilling. The ore reserves calculations and all that are based on creating a three-dimensional model from the results of the drill holes.

Swent: You were sending samples off to be assayed?

Enderlin: Samples were assayed, the geology was logged from the drill holes; all that would be pieced together into a series of cross sections that would define what was--the estimate of a shape of an ore body. From that, pit planning was developed. The pit was not mined as one big giant cone, but was mined in a series of smaller pits that ultimately merged to become the ultimate pit that we see today.

Swent: So somebody in the engineering office was making these decisions.

Enderlin: Tim Janke and his staff were making those decisions. That was the scheduling part. The mine engineering, again, would forecast. Looking ahead they would determine how to develop a pit in stages to assure ore production. One of the problems at McLaughlin is, in terms of planning, that there's a lot of waste rock that must be removed, overburden that has to be removed in order to expose ore bodies. The burden of a mining engineer, and it's a very great burden, is that you must design the pit mining schedule so that you're never in a situation where all you've got ahead of you is waste rock. A mill can be a very hungry thing, and a very expensive thing to shut down.

So the engineers, probably the most difficult task that they had was to schedule, and that's why their scheduling activities were, in their mind, so critical, whereas the operations folks, who had to deal with trying to implement these schedules, would get frustrated. And round and round we go. The schedules were based on the ore reserve estimate, and the ore reserve estimate was based on a block model, a computer model that was created based on the model of the geology, the results of the analyses from the exploration drilling. It was all pulled together to create a three-dimensional depiction of what the geologists expected was there. The engineers would take the geological interpretation and transform it into literally a stack of bricks, each brick with its own value, basically. That's what's called a block model.

Swent: And where was this?

Enderlin: All in the computer. In 1985 that was a long process to do a reserve estimate. The Mining Engineering Department at the time when I was hired on, had one IBM PC, and they had just acquired an IBM PC AT, which was hot and very, very expensive. And the AT, if you turned it on at the end of the day shift at three o'clock, and let it run overnight, you might have an ore reserve model update in the morning at seven o'clock when the shift began the next day. We've gone a long way since those days.

Recalculating the Ore Reserves in 1986

Swent: How is it now?

Enderlin: In the last ore reserve models that were done, we had one engineer working at a computer who could regenerate a model within a matter of a couple hours, basically. I mean, doing far more than just doing a raw run. He would actually have a final product, calculations and all.

Where I learned the most initially about the ore reserves was also in that 1986 period. Now one thing that Norm Lehrman did, aside from turning me loose in ore control, he also pulled me into an exercise to recalculate the ore reserves using multiple approaches. That was done in 1986 when McLaughlin was faced with a big dilemma. We had just mined through--this was during the period that I was actually gone from the property between 1985 and '86. That winter they had mined through a sequence of benches that were supposed to be very high grade, very high grade. I think something like 4 ounces per ton was supposed to be there. Which looking back now is something that we rarely saw at that kind of scale at McLaughlin.

That one area of the pit was predicted based on the ore reserves model, and so the mine planning had been scheduled specifically to go after that sweet spot. The first pit, which was called the P3 design, was scheduled to go down in that specific area to keep ore flow going through the mills while we stripped certain other areas. Those ounces weren't there.

Swent: Oh, my.

Enderlin: Successive benches, at least two benches, perhaps three, I forget how many, were mined and the ounces weren't there. This ore body that was supposed to be hundreds of feet in dimension turned out to be about the size of a pickup truck. That particular ore body was defined from drilling based on a very early drill hole, drill hole Number 40, and it was a rotary drill hole. It wasn't like Cherry Hill where it was a wet one. It was drilled in dry conditions, so the results were very good. The data that was collected from that drill hole was valuable data; it was just over projected.

The hole's name was 40-R. The way we designated all the drill holes was either as an R for "rotary," or usually a DD for "diamond drill," for core holes, and 40-R is another one of those things that you will hear people talk of in Homestake circles, because that one hole alone almost closed the McLaughlin Mine down in 1986 and 1987.

When I did come back in '86, and after I had wrapped up my fieldwork and was starting to dabble in ore control, I was pulled into a reserves audit. We had a development team of engineers and geologists come from the Golden [Colorado] office. A task force, you might say, to look at every possible potential flaw, how to remodel this ore reserves calculation to see what went wrong at McLaughlin.

Because here we were in the topmost benches, and these ounces weren't there. I forget all the names of the group that was here: Gale Hansen was one, we had some of the exploration group come and go, but we also had Ted Rizzi, and Dave. I've forgotten Dave's last name now. That was a long time ago. Anyway, they were with the Golden group, and came out with specific instructions from Al Winters, who was the VP at the time, to figure out what went wrong, and correct it, and see if there was anything left worth salvaging at McLaughlin. I'm sure there was a strong concern that McLaughlin may be shut down before its time.

So I got pulled into that, because--

Swent: Was Jim Anderson still aboard?

Enderlin: Jim was aboard, but he wasn't involved with that. In fact, I think Jim was--I'm not sure at what point Jim actually left, but it was right at that time frame. But this was a separate deal; this was an engineering exercise, not an exploration exercise, so he really wasn't that involved with it anyway. Where I got involved with that, was all of the geologic modeling was done by hand. There was no computer modeling, and only the final results, the end product, was built into engineering computers, the IBM-PC and the old PC-AT.

So this task force, our primary job was tabulating information, graphically putting it on cross-sections. All of our ore reserves were modeled on cross-sections, slices through the deposit. And then using a planimeter to calculate areas of odd shapes. It's a very convenient little tool, which can--you can scribe over a given area and it will tell you exactly what the area within that scribed line is. So a pretty powerful little tool for the time, but nowadays with AutoCAD and all the modern features on board a computer, planimeters are no longer used much.

Anyway, very tedious, very labor intensive. And each of us--I was assigned to this team to calculate some of the ore reserves in specific manners--we looked at different types of geological interpretation. We looked at cross-sections in one direction. We looked at longitudinal sections, which are cross-sections along the long axis of the ore body. Slicing and dicing, and looking at different methods of interpreting the geology, different ways of projecting distances, just beating the horse to death trying to find every possible means of calculating and recalculating the ore reserve to see if there was a more conservative approach and one that was more appropriate to what we had actually mined through. It was a big project.

Swent: This was all still in the truck shop office.

Enderlin: This was in the truck shop office. Yes. And we were all pretty much camped out there.

In the end, all of our calculations done independently came up with the same numbers. McLaughlin just yielded data in that form, and there was no way to eliminate 40-R. It stood by itself as being a very real and very valid number. So in the end what we ended up doing was simply cutting grades. The rule that came down, to adjust the reserves to match with what was mined, was: any drill hole intercept that was over one ounce per ton--and of course in the case of 40-R, it was multiple ounces per ton--any drill hole intercept over one ounce per ton was cut to one ounce per ton, before it was averaged together with the surrounding data to create the geologic model, which then was transformed into a block model. What that did basically was make the McLaughlin Mine appear in the ore reserves model as lower grade, less gold in it.

Swent: Less than had been projected.

Enderlin: That's correct.

Swent: And also maybe less than was actually there?

Enderlin: Well, in the end what you'll find is that in the--less than was modeled at the time. The model is dynamic. Every year it's updated. So it's ever changing. In the end we ended up mining much, much more gold than the original model ever even predicted, and that was through changes in the way we processed the ore, changes that were put into effect in the model based on the results of exploration that we did through the years.

Swent: If you had a hole that came out at 0.04, you were still entering it in the data as 0.01?

Enderlin: Well, it was still--

Swent: Or in your model, as--

Enderlin: Well, only one ounce per ton. So in a 0.04 drill hole or anything like that, it was only the high grade intercepts. And those weren't that common. The McLaughlin Mine is relatively low grade; by Nevada heap leach standards, we're extremely high grade, but for this type of an ore body that does require the type of processing we have, it is quite low grade. And so those high grade intercepts were simply cut, to a conservative end. There was no rocket science involved in the cutting, actually. It was simply, let's pick this number and see how it reconciles with what we've just mined. And it worked.

It was a very simple rule and easily put into effect. And if you look at the annual reports for Homestake Mining Company, you'll see a reflection of that adjustment that was made. It dropped our ore reserve from a little over 3 million ounces to about 2.9 in '87. So significant in terms of an ore reserve.

Swent: It had been bumped way up though earlier, from 1 or so to--

Enderlin: Well, yes, when the original announcement was made, when Homestake went public [with McLaughlin], it was 1 million ounces. That was the magic number. It was officially a "world-class" deposit. The initial press release that came out was based on a 1-million-ounce resource that had been identified. At that point there were enough ounces to justify taking it to the next stages in project development to look at it a little more seriously as a potential viable mine. When the original announcement was made, most of what was later identified as the north pit ore body hadn't been explored yet; a lot of the additional ounces came from the northern part of the ore body that was later defined by step-out drilling.

So in the end then, we went from the 1985 resource, which was around 3 million ounces--actually not resource, but reserve--that portion that we expected to actually mine--up to about 4.2 million ounces. Our 1996 mine model identifies an ore reserve of 4.2 million ounces. That's not all the gold you recover. Out of that then, there's a portion of gold that's lost in the course of processing. So what we'll be looking at then towards 2002 will be somewhere around something less than 3 1/2 million ounces. We poured our 3 millionth ounce and probably looking at something like 3.3 million ounces when it's all said and done. We won't know until we get there, but that's the target.

We've come a long way when you think about it. We will have recovered more gold than was even estimated in 1985. So we did well through the years, and we did well through a period of very adverse economic conditions. The price of gold has not been kind.

Swent: Terrible.

Enderlin: If you look at the original ore reserves estimate, and that's the one that the 3 million ounces was based on, that was using a pit design at $600-per-ounce gold.

Swent: Which was a little bit conservative at that time.

Enderlin: Well, at that time gold was floating around $580 I think, but the model always stretches.

Swent: Gold was at $800 at one point.

Enderlin: Yes. The models always stretch a little bit. You always look ahead and think it's going to be a little bit higher than we expect. So the $600 pit I think was based on about $580 gold. And through the years then we stepped back to the $400 pit, and the $300 pit, and so it was just constantly changing, constantly moving. It's very difficult to actually look back at the original estimates versus the final results and to compare, because it's always changing. During the course of operations, we went from milling 3,000 tons of ore a day to now over 8,000 tons of ore a day. That has had a profound effect on our economics. The McLaughlin Mine was never designed to speed up ore processing this dramatically. It was supposed to be a long process at lower grades, but given the economic conditions, there was no other choice. So things worked out.

In 1988 we expanded the milling. That took place as a matter of survival. We doubled our milling capacity and ore processing capacity by adding a second set of SAG [semi-autogenous grinding] mills, and ball mills, as well as a secondary leaching circuit. At that time in 1988, the secondary circuit was used for ore that didn't require the autoclaves. We found during the course of mining that there was a substantial tonnage of ore that had been naturally oxidized that didn't require the autoclave pretreatment step to artificially oxidize the ore. So those ores were set aside. That was another one of our pin flag colors; the blue for what we call CN-ore; CN short for cyanide, which were set aside specifically to be run through the secondary circuit. And very very cost-effective ores because by bypassing the autoclaves, and the enormous expense of operation of the autoclaves, and everything associated with them, those ores were very, very economical to process.

Working on Ore Control in the Pit

Swent: I'd like to just be more specific about what you were actually doing there in the pit. You were giving hand signals to the drivers.

Enderlin: Well, we can go into details.

Swent: How were you deciding? There's a gap here.

Enderlin: Yes, we need to--we're starting to branch off into a whole variety. And that's what was going on at the time. There were a variety of things happening. Ore control, yes, was pretty unique. It's something we ought to get back into. Yes, we can go back on that.

Swent: I'd like a real step-by-step detail on what you did.

Enderlin: Sure. Yes, we can do that.

Yes, it was working very closely with equipment operators.

Swent: Do you have a piece of paper in your hand that tells you this? You aren't sampling, are you?

Enderlin: Well, the one thing I had in my possession that the equipment operators didn't was a map of every blast hole and the gold grade that was found within it. And so I had the authority--if I questioned the validity of that blast hole, I could shift the whole mining heading over, and what was defined as waste we might mine as ore, or what was defined as ore, we might mine as waste. If it looked like something wasn't reconciling--

Swent: You could shift the whole mining--

Enderlin: You could actually direct tonnage that was initially flagged as ore, you could direct it to the waste rock dumps if you felt that it was waste. So if you saw something that was terribly wrong, it didn't reconcile well--and we were very fortunate at McLaughlin in that the ore body is a very visual thing. It's very easy to see the ore and the waste. You had the authority out there in the field to shift things around, and that was--through the years that authority actually expanded. Initially it was very, very tightly established what I could and couldn't do in the pit.

Swent: So you were standing there. There are how many machines; now many loaders are running around?

Enderlin: Typically there are one or two loaders running.

Swent: Okay, and you're telling them exactly where to scoop up--

Enderlin: Well, they have a map in front of them, a map that I prepare at the beginning of the shift and give to them, that shows this is the ore heading. It actually draws a big bold line that shows where they are with respect to all the sea of flags and ore blocks. They are given directions as to what blocks we want to mine out, priority, what directions we want to go.

Swent: And when have you done this map?

Enderlin: The maps are done between shifts. And so my responsibility--in those days it was just single-shift mining. We were only mining a day shift, so it was easy.

Swent: Well, but a shift starts at seven in the morning, and when are you making this map?

Enderlin: You would get out a little bit early and you would do the map, or you do it at the end of the day, at the previous day.

Swent: The day before?

Enderlin: Yes, because you would be out there and you could just make a sketch and then have it on the boards ready for the next day. It got more complicated when we started doing round-the-clock mining, because then one geologist couldn't handle it all. And in the very end we got to the point where it was so complicated, and there was so much ore, that you had to have a geologist assigned to every crew.

We were actually mining, at that time we were doing revolving shifts, and so each of us was assigned--we actually had three people, each one assigned to a specific crew doing revolving twelve-hour shifts. I'm glad that that's over.

Swent: Oh, yes.

Enderlin: But those days we had a shovel, and so you would sit literally in the cab with the shovel operator, pointing out as you mined, what was ore and what was waste.

Swent: And where did these hand signals come in?

Enderlin: Well, we didn't need the hand signals at that point.

Swent: Ah.

Enderlin: That was--in the early days they had only front-end loaders, which is just a little tiny narrow cab, and the loader operator is doing his thing in there, and so he could see you. You would stand up on the rock above him, and you know, look at the ore. If it was really complicated you could tell the loader operator to kind of hold off a little bit, and you would go down and look, and then get out of the way. We tried not to do that too much because it would slow down the production. The loader operator would watch you. Especially some were more confident than others.

And the ones that, if they got into a bind, every scoop basically they would look at you to see what--. At the time when I went into ore control there were some that were literally new hires, and others that had been there for a very long time and knew the ropes. The experienced operators, when I first got into ore control in '86, were Mike Bolt, Mike Matthiesen, and Bert Wacasser was around. I'm trying to remember if Bert was doing some of the--

Swent: He was connected with the owners of the Manhattan.

Enderlin: Yes, and I'm trying to remember if Bert was working loaders along that time. There was quite a bit of turnover around the loader operators at that time, but the two most experienced ones were those: Mike and Mike, who are both gone now.

Swent: Were any of Bill Wilder's family still involved?

Enderlin: Of course, the Wilders were very much involved during the exploration. They were basically a second crew, a support crew. But at that point in time, the One-shot Mining Company, you might say, Bill and his crew, were no longer directly involved. The folks that were in later years part of our McLaughlin operation would be Kelly Wilder. Kelly worked on our blasting crew for many years. And of course Bert. I think those were really the only two that would have been part of the One Shot, except for Rick Barber and his wife Laura.

Getting back again to the loaders and our communication, you try to--if you have multiple loaders working, you would go from one to the other. And I mean the loader operators would do fine. They were able to mine the ores and make judgments on their own. Your function was to help them to try to, if there was a problem, to try to sort it out so that they knew how to go.

I think I said before, I think the worse case we ever had was something went dreadfully wrong with the collection or analysis of samples one time. The results that came back, instead of these nice coherent blocks of similar ore grade that you normally saw when the engineers plotted out the layout of the blast holes and their analyses for each hole, instead we saw more of a checkerboard pattern, a scatter of high-grade pink blocks and white blocks for waste, scattered all over, not making any sense at all. That particular pattern we mined the entire thing visually. Ignored all the ore blocks entirely. That was kind of a special case. I never did figure out what happened to that one, but those were the sorts of the decisions that were made in the field.

Swent: Well, now, everything got picked up.

Enderlin: Everything was mined. And of course in waste rock headings--

Swent: So it was a question of where you dumped it?

Enderlin: That's correct.

Swent: Or in what order you bring them out?

Enderlin: Essentially there were three destinations for rock that came from the pit. There was waste rock. That was rock that had essentially no gold in it. It was simply an overburden rock that had to be moved out of the way to expose ore bodies. And that went to our waste rock dumps, primarily to Site 5, the larger of the two, which is also called our West Waste Rock Facility. In later years there was another one, the Barker dump, which was our East Waste Rock Facility. And then in the very final years we also had the in-pit backfills, the north pit and the south pit. So that was the first type of rock.

The second type of rock, which is the stuff that paid the bills immediately, was mill feed, or "lot material," as we called it. Lot material was defined as any rock, usually a collection of pink and red blocks in those grade ranges above 0.1 ounce per ton, that were suitable for mixing and sending through the autoclaves. So it was high-grade ore, going straight to the crusher. It would be mined and dumped on a broad flat pad, just a flat earth terrace, dumped by the haul trucks to cover that area.

Usually the size of a given lot was anywhere from 3,000 to as high as about 10,000 tons. The lot was a combination of multiple ore blocks. The blocks again were the geometric shapes that were in the pit denoted by the pin flags. What the Mine Engineering Department would do would be to select ore blocks from different headings throughout the mine pit area, trying not to just mine from one particular spot, but select from multiple headings to blend the ore to achieve the uniform chemistry that the autoclaves demanded. The autoclaves could not tolerate sulfides much higher than about 3.8 to 4 percent, but neither could they tolerate sulfide in the ore that was much less than 3 percent, the sulfide being like pyrite, being other minerals that are part of that category. When they went through the autoclaves, they chemically broke down. The whole object was to break down sulfides to liberate the gold. And in that process of chemically breaking down, it's a chemical reaction called an exothermic reaction. Which means that it gives off heat. And the autoclaves relied on that process of giving off heat and working almost autogenously; once they were up and running they were almost self-perpetuating. The heat would be collected by heat exchangers and used to preheat new ore slurry coming into the autoclave, which in turn entered the autoclave, reacted, gave off more heat, captured by heat exchangers, and so on.

The other thing we had to watch closely was carbonate content. In our quartz veins there is also calcite, dolomite, and minerals that are part of what are called carbonates. In acidic conditions, in an acid environment like you create in an autoclave, carbonates react and they give off carbon dioxide gas. They bubble, they fizz, they effervesce. You don't want that in your thickeners and certain parts of the process, including the autoclaves. They make a mess. [chuckles]

So the ore control geologist's function was to use the information that the ore control engineers had devised, to select given ore blocks from different areas in the pit, and see that they were delivered to the lot pad so that they could be mixed and crushed. Again, a given lot was usually 3,000 tons or up to about 10,000. Blending was the name of the game. The blending process would begin from the time that the ore left the pit. The rock would be dumped by the haul trucks randomly on this pad in such a way that you had a nice checkerboard of different types of ore from different areas of the pit.

The crushing utilized what was called a radial slewing stacker. There's a mouthful for you. The slewing stacker was simply a conveyor belt that was constructed on an elevated platform on wheels. The wheels would glide along a track like a railroad track, over an arc, so that this was not a stationary conveyor belt that simply dumped rock into a big conical pile in one spot. Instead, by moving the stacker back and forth by means of a motor, you create this broad arc of nicely-blended ore. Just back and forth, layer after layer. And that kind of added to the blending of the lot material.

In the mills the mixing would take place even more. And in the tanks, the surge tanks that stored the slurry after the mills had pulverized the ore, the blending was even more thorough. Then finally by the time it got up to the autoclaves it was pretty well blended down. The ore control aspect in the pit was the beginning of that whole process of blending down and selecting for the autoclaves.

The third category--we've talked about waste rock and we've talked about lot material. The third category was the stockpile, the ore stockpile, which also changed in the way we managed it through the years. In the initial planning there were two flat terraces or pads that were developed to store the lower grade material coming off the mine. The lowest grade material, the green, actually was collected and stored on one of those pads, but at the time that it was originally designed, green was not economic to run. It was rock that an engineer would refer to as a protore, meaning you hope that some day it's going to be ore, but it's not technically ore. It's not economic to process at this time, so the green was a long shot. It was kind of a measure of our optimism that somehow, either by the price of gold going up or by improvements in the way we processed the ore, we would find a way to make the green stockpile viable. That was one of many other stockpiles that ended up being built.

The other stockpile that was originally designed was called the yellow stockpile. Now this is going back to the beginning: green and yellow, the only two. These pads were designed to be sizeable enough to accommodate all the tons of green and yellow, these two different grade ranges, through the life of the mine. Well, that's before the price of gold started going down and before we had to completely change our mining schedule. When we built the second mill and sped up the whole process, we also accelerated the mining rate, and by accelerating the mining rate, we generated far more stockpile material than we initially had planned to deliver up to that pad. It's just as a consequence of changing one key component in the whole system, the whole network of mine planning issues was adjusted accordingly, so we had in the end a much larger stockpile than was ever envisioned.

That's one reason why McLaughlin is kind of unusual, in that in 1996 when mining operations ceased, we had a very large stockpile still there to process. That's why since 1996 we've been processing from that stockpile and will continue to process into 2002.

So that was the third category of ore. And it changed with the years. We added to the stockpiles, took from the stockpiles. It wasn't completely a place where ore was placed and never taken away. Depending upon the needs of the mills, we did have areas that were called live stockpiles where the rock was stored and then taken away.

So that was part of our work in ore control in the pit. Ore control, the biggest responsibility of all was communication: communication between mine engineering, between mine operations, and between those departments and the people in the pit that were actually mining the ore. And again, it was a great opportunity to work very closely with the equipment operators.

Swent: What about safety?

Enderlin: Well, safety, of course, as everyone you've interviewed will tell you, is a big issue. And certainly for someone who's walking around on foot in the middle of haul-truck traffic, you become quite acutely aware of safety issues.

Swent: Were there accidents?

Enderlin: No. Certainly not in the ore control. The haul-truck traffic and the heavy equipment, I mean, you have minor dings, but very, very few accidents.

One that did occur, and this was not related to anything that I was directly involved with in the pit, we had a haul truck back up to the edge of one of the waste rock dumps and go over the edge. I think that occurred back in 1986, 1987, very early on. We had one back up, again, to a dump where a berm wasn't--this was one of the stockpiles--and go over it, too.

So those happen. The berms are probably the toughest part. A haul truck, when they're backing up to empty a load of ore, they usually back up to some point where it's safe and stop and raise the bed. But the truck comes to a halt, and then all the power in the truck is directed towards lifting the hydraulic ram that dumps the bed full of 80 to 100 tons of ore. It takes a lot of power to do that. There's always a risk in backing up, not being able to see what's in back of you.

As I say, there were a couple of instances where they backed up too far, but those were rare, and in the pit itself we had very few incidents. It was a very safe operation, and certainly in my perspective of things, we didn't see any big problems there. You had to respect the equipment and be very careful around them. Actually out of consideration for the heavy equipment operators, to ease their concerns, you tried to be very apparent to them at all times. One thing that we learned very quickly is you don't walk behind a piece of equipment. I mean, even if the operator knows you're in the vicinity, the minute you're out of view, the equipment operators become very concerned over your well being. As a courtesy to them it's always good to let them know when you're in back of them, or let them know when you're out of view.

The haul trucks have what's called a blind side. If you look at a haul truck, the operator's compartment, the steering wheel and the little cabin that the operator is in, is on the left-hand side of the vehicle. Kind of like in a U.S. manufactured car. To the operator's right, you have this big bulk of a haul truck, the frame of the haul truck, the bed, the part of the bed that laps over the top of the cab called a headache rack. It's a terrible blind side. They've got a little mirror off on that right-hand side that's kind of one of those bubble mirrors that has a wide-angle view, but it's very difficult to see out of. And so rule number one in working around a pit is, don't walk around the blind side. It's very difficult for the operator to see you. So again, you try to accommodate their concerns. And the equipment operators have always been very, very conscientious about trying to be aware at all times of what's around them, because the equipment is so big and so heavy that it can go over a pickup and never even know it hit it. And so they're aware of it. Nobody would want to cause an accident like that. That could be very severe.

Doing In-pit Geological Exploration

Swent: How long were you working on this ore control?

Enderlin: I worked for several years, but eventually I started training in other aspects of things. It seems like Norm Lehrman was always rotating us, always trying to expand each of our skills in the department. Jeff Wilson and I kind of worked hand in hand with the ore control. Pete Schwarzer was primarily pit geologic mapping. In the end I began to move into exploration, in-pit exploration. Norm had been pretty much in charge of it. In 1986 and 1987 there had been some limited diamond drilling done in and around the pit that was coordinated by the McLaughlin geology staff, not the exploration group. And that had been Norm's primary responsibility. He and Jeff actually both had done some: had planned out the drill holes, supervised the drilling crews, collected the core, logged the core, sampled the core, all those things that go with exploration drilling.

Norm's activities began to pull him away from exploration into other things. The company desired to send him abroad to investigate ore bodies, both in North America and in Asia, or ultimately in the former Soviet Union, in Uzbekhistan. Norm's activities were such that he had to relinquish the responsibility of the drills to somebody, and I ended up by default becoming the one in charge of all the drilling. So that was kind of the next step that I went into. More and more I had to step away from the ore control, and more and more I was pulled into the exploration drilling, which I really enjoyed.

In the end I really have had a lot of fun working with the diamond drill crews, who can be characters in their own right. And try to work out three-dimensional modeling and projection to try to anticipate, you know, where haven't we looked. Here's an ore body that has been intensively drilled, and as we mine and as we understand and gain experience in the ore bodies, we begin to see how these ore bodies are shaped and how they might project deeper into the earth. We have a diamond drill at hand, a very expensive piece of equipment--they were all contractors--who is at your disposal. If you think that there is something that was missed in the drilling, it was your opportunity to test your own savvy as a geologist, to see if there was something that someone else had overlooked or simply not been able to see given the resolution of the old data. So that went on for quite a few years.

Swent: There was an underground development at one point.

Enderlin: Yes, the drilling budgets were quite meager in the late eighties. Meager, meaning say $100,000 a year. At over $20 a linear foot for core drilling, you can burn up that kind of a budget very, very rapidly, so you had to be very selective in the number of holes.

As the mine matured, and as the end of open-pit [mining] became more and more of a near term reality, the budget seemed to open up a little bit, especially under Ron Parker's direction as mine manager. Ron was pretty liberal with the budgets and also was pretty aggressive in campaigning for expanding exploration at McLaughlin. So towards the end, in 1994, especially, was our busiest year in exploration; I had, I believe, about three diamond drills all running at the surface, plus we were doing an exploration drift.

We decided we had had enough interesting results underneath Gail Ridge, to justify exploring directly first hand with an exploration drift. What we had identified with the diamond drill results was a linear trend of very high-grade ore, high grade by McLaughlin's standards, where the gold was visible in every drill hole. It yielded usual intercepts in excess of one ounce per ton, in the ballpark of potential underground development.

One thing that wasn't known was what sort of ground conditions it was in. It was in a rock type--it's a volcanic, it's part of what we called the Zodiac sill. There were a series of these volcanic intrusives that pass upwards along the Stony Creek fault. The Stony Creek is this boundary between the serpentine and the Great Valley sequence. These sills are volcanic. They were part of the volcanic period that generated the heat that made the hot springs, and because they're a brittle rock, they also tend to shatter and fill with vein matter themselves.

The Zodiac is kind of at the geometric center of the McLaughlin deposit, and has been a good ore body. It yielded a lot of very high-grade ore. What was unusual about the Zodiac was that the high grade persisted to such great depths. A thousand feet is a long way down. Those are some of our deeper diamond drills, drill holes. We had reached the point where we decided to go investigate. We designed a decline to run equipment using a contractor to run equipment into the heart of the Zodiac sill to explore first-hand some of these high-grade intercepts that we had encountered.

That was all done in 1994, and it was a very, very busy year. The decline was not able to get to the very bottom of what was originally planned. The original target was to get to a zone of very, very concentrated high-grade intercepts. There were a series of drill holes that all clustered around a pretty sweet pocket, and we hit some bad ground. We hit a cross fault that yielded some terrible sheared mudstone that just wouldn't allow us to continue safely. We backed up and launched a kind of a spur that got us down to near the target depth, but in the end, what we did accomplish was mostly to cut at intervals drill stations and do a lot of underground diamond drilling.

That was an interesting project in itself. The underground drillers were from Idaho. They were called Northwest Drilling. And very experienced. They used a type of drill I had never seen before. I was so used to the surface drills, I had no clue of what an underground diamond drill could do and how it would run. The type of drill that they used was called a Hagby, which was a combination of electric/hydraulic and extremely fast; extremely fast drills. We bored a lot of core. And we did find a lot of high grade, but not enough to justify going after with production underground.

We did in the end expand the pit design, and we did actually carve out a portion of what was defined by that drilling as part of the north pit. So there were some ounces that came back out of that based on our work in that decline.

It's ironic, too, that the prettiest specimen of gold we've ever collected on the property came from the rib of that decline. The chief mine engineer at that time in 1994 was Jim Whitlock. Jim had been down in the drift and had just inspected a recently blasted muckpile at the face of a little lateral cut that we had made to look at one of the high-grade pockets that had been identified in the earlier drilling. Jim came in with a little specimen of quartz that had some stibnite. Stibnite is an antimony mineral that's very common at McLaughlin. And in that stibnite were little dendrites of gold. Jim said, hey, look at this. You know, he brought it in, and all excited; we had actually seen some visible gold in the decline.

He and I went back down there, and he showed me the muckpile and showed me these little quartz veins with the stibnite in them. He was looking for more. In the meantime, I stepped back and was looking on the rib, the right rib of this particular cut, and here was this about a nine-inch-long exposure of free-growing gold dendrites, standing out above the rock about a quarter of an inch or so. The coarsest free gold we've ever seen. Just a beautiful specimen. We still have that locked up in the safe at McLaughlin. But the thing is a world class gold sample. Prettiest we've ever seen. So it was ironic that that piece had come from the Zodiac drift. And we never--

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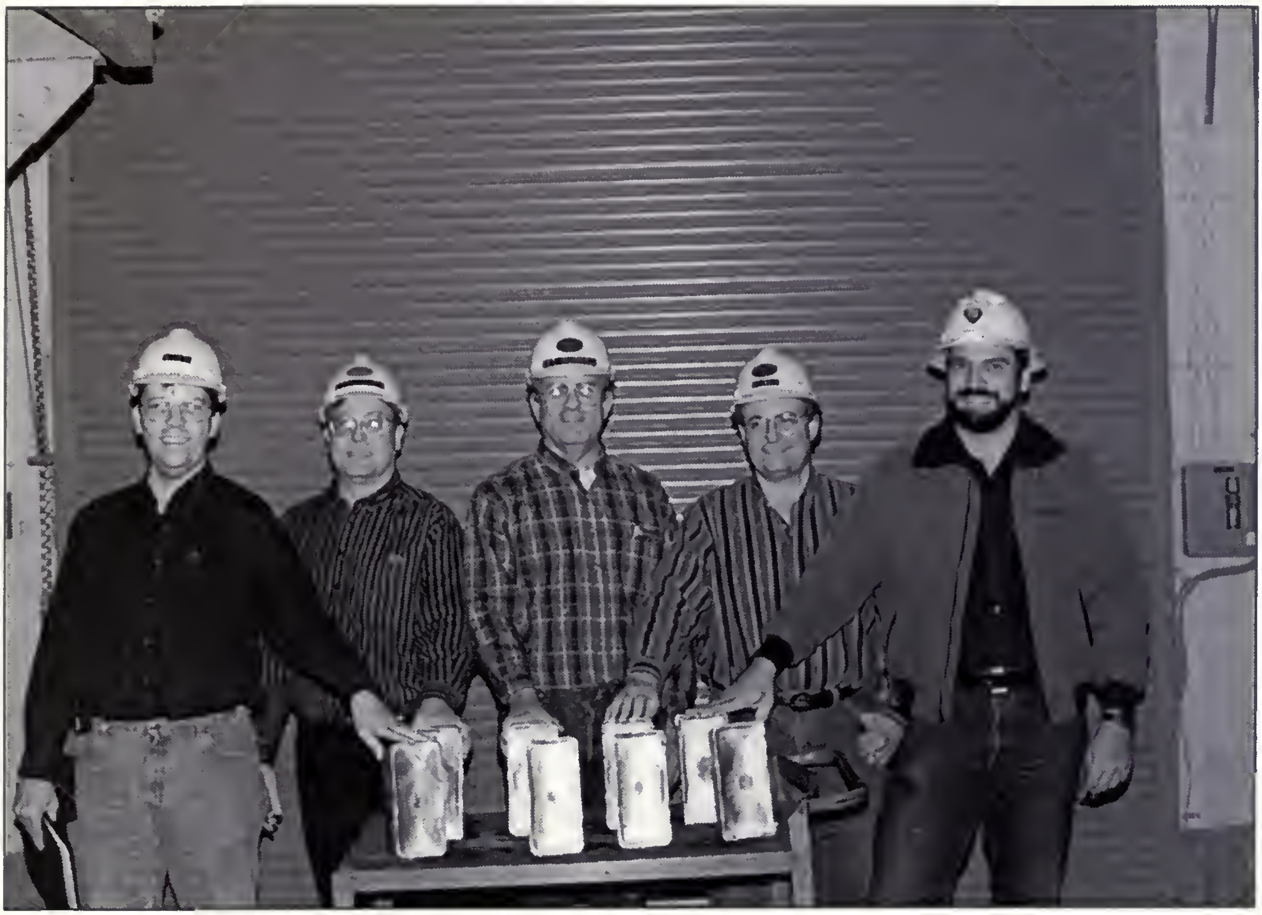
Homestake McLaughlin Mine
2 millionth ounce pour
October 15th, 1993

Front row (L to R): Jim Fleming, Dave Hyatt, Pat Purtell, Dean Enderlin, Tim Janke

Back row (L to R): Al Jones, John Mack, Royce Smith, Ray Krauss, Don Field, Jim Whitlock, Ron Parker



McLaughlin Mine 3 Millionth Ounce Gold Pour

February 23, 1999

L to R: Will Davis, John Mack, Pat Purtell, Blake Brown, Dean Enderlin

Swent: So you found your most beautiful specimens just at the end of the day.

Enderlin: Just at the end. The open pit, even though we expanded the open pit into that area where we found that beautiful specimen of gold, we never did quite make it down to that level in the pit development, so that little stringer of quartz is still in the hillside right where we left it. There were some pockets of gold that we left behind. In an open-pit operation you simply can't get it all. The McLaughlin ore body is shaped something like a turnip, you might say. It flares very rapidly near the surface, and so the bulk of the ore was taken out by the pit, but you always have those little roots. We looked long and hard at chasing them, and we did mine them as deeply as we could for the most part.

Another interesting specimen that is right now at our corporate headquarters in Walnut Creek, is a piece of core that came from about 400 feet below where we left off in mining in the north pit, a little bit further north of the Zodiac sill. It's about a 6-inch-long piece, with a quartz vein that shows just massive gold dendrites, beautiful coarse gold. Unfortunately we drilled very closely a series of other diamond drill holes around that intercept and couldn't reproduce the results; it was basically another 40R-type pocket. Still, it's the prettiest piece of core that I've ever seen and I think that has ever come out of McLaughlin, and so it's probably displayed.

Swent: That's what keeps people going, isn't it?

Enderlin: That's right. [chuckles] So that was--in the end that was my primary responsibility while the Geology Department was still functioning.

Head of the Geology Department, 1993

Enderlin: In 1993, in January of 1993, I took over the whole responsibility of the department. Norm Lehrman left McLaughlin to join the Reno/Sparks exploration group. He stayed over into January of that year, but for all purposes, I was taking over the department at that point. That was a big change. That was a tremendous change. We had also lost Pete Schwarzer. Pete also was laid off from McLaughlin, but ultimately transferred to the exploration group, and was ultimately laid off from them, too. So one by one we saw the original geologists on our staff move on. Jeff Wilson did the same thing. He, too, transferred to the exploration group. And so in the end, by attrition--

Swent: There you were.

Enderlin: --I turned out to be the last one.

We did receive a transfer from Lead. Gordon Nelson, who had been chief geologist there, was transferred out in the later years. Gordon worked with us till the end--the end of the open-pit operations.

Another geologist who came from Reno fairly early on was Greg Brasel. Greg transferred to McLaughlin in 1987, not long after Pete Schwarzer had shifted into the Geology Department from the Environmental Department. Greg's opportunity was kind of unique. We had identified the need for more ore control. At that time I was moving into drilling, and the old shuffle of staff, and Greg had been basically given layoff notice at the Reno office. He was working with our exploration group. Norm Lehrman managed to finagle him into coming into McLaughlin. Greg stuck it out also to the bitter end, you might say, of mining operations. Greg ultimately was the general foreman in charge of our pit operations. Greg really enjoyed, not just the geology, but he enjoyed the aspect of the planning and the working with the heavy equipment, and so he was a perfect person to be put in charge of literally the day-to-day routine of working with the heavy equipment. Greg right now is working for Glamis Gold at the Rand operation in southern California. He went with David Hyatt. David was our mine superintendent, who was also laid off in 1996. With that operation scaling up, the two were able to fit into the mining activity still. Greg is still there.

So anyway, those were our geologists along the way that came and went through the department; Norm Lehrman, Jeff Wilson, Greg Brasel, Gordon Nelson, Pete Schwarzer. We did have one technician that worked for us, who was a pretty neat guy, and his name was Mike Sweeney. Mike was our geology technician. He hired on I think around 1988. He hired on as our core cutter, and so for many years Mike Sweeney cut core.

The practice for our exploration at the mine was to save half the core for archiving purposes in our core library, the core shed, and the other half would be sent off for laboratory analysis to determine the gold content. Our type of rock, just because of the way it shatters and the way it breaks, it's better to cut it with a saw rather than to try to split it with a chisel, which is sometimes more commonly done. Mike Sweeney spent many, many hours working with a diamond saw, basically slicing rock, slicing core. But a more dedicated employee you could never hope to find, and Mike did well. Mike also, in the end when the Geology Department shut down, there was obviously no longer a need for Mike's services as a core cutter, and so--that was in 1995--Mike's role shifted into actual ore control supervision as well. Even though he didn't have a geology degree, he was sharp enough to where he was able to step into that role and continue in that role up until mine pit closure. So he's our honorary geologist in the department to serve that function.

Swent: What about weather? You haven't mentioned that, but isn't that important if you're down in the pit?

Enderlin: Well, you know, here I am a fourth-generation Napa County resident, and until I got to McLaughlin, I never realized that we had road runners in the county. I knew the first year when I was hired that there must be something very unusual about the weather in that part of Napa County if you see road runners running around, something that you should be seeing in the desert. So it is a--that particular part of the region is above the fogs that come into the Bay Area, so it doesn't cool down as much in the summer in the mornings. It stays hot, and so the summers are very intense and very hot. And the winters, because of the elevation, which is around 2,000 to 2,300 feet, the winters are a bit cold, and you can get some snow and a bit of chilly conditions. So you get extremes in the season. You don't get huge amounts of snow, but certainly enough to be a cold, wet snow.

I've had people who have worked in some of the coldest basins in Wyoming, you know, on drill rigs, and come out to McLaughlin, and be so tolerant of cold, saying nothing would affect them, and they just freeze and shiver, and say this is the coldest, most miserable I've ever felt. Just because it's a wet cold. Working out in it is just--it's not like a dry cold that you get in some climates. So wintertime was always not a very pleasant time in the pit whether you were in equipment or out in it.

No matter how deep we mined into the rock, everything had to be drilled, everything had to be blasted, but all that rock would just turn to mud in the middle of winter. The heavy equipment just churns it up, and so that made for a very sloppy, miserable time of year, but production went on.

Swent: You had a couple of years where there was exceptionally high rainfall.

Enderlin: Well, the one year that was extremely high was the winter of 1985 and 1986. I wasn't at Homestake that winter.

Swent: You missed that one.

Enderlin: That was the winter that Davis Creek Reservoir filled up in a matter of days. Everybody talks about it, but I wasn't there. I was here at home fighting that flood.

Swent: They had another bad one here just a few years ago.

Enderlin: Well, we had El Niño conditions, which was--yes, higher than normal rainfall, but it was the way it came down, that was more of a Pacific Northwest pattern, where every day was drizzly rain. Instead of the normally highly intense rainfall events, followed by periods of dry, you had this long drawn-out process of just gradual rain. That created problems in terms of just containing water that couldn't be discharged. From an environmental standpoint, you had to start dealing with conditions that aren't the norm for our containment system. We managed to get through that period okay, but, boy, it was a very different type of a condition than we had had before.

The summers were extreme, too. There was one particular summer when I was still doing the mapping down--I think that was in 1985--when I was doing my first mapping down in the waste dumps. Norm Lehrman came down looking for me because he was convinced I must have died somewhere because of the heat that day. But I hadn't, having spent time doing all the mapping in the deserts, I was used to it. I knew how to pack water and not get myself in trouble.

Yes, the seasonal conditions were a bit extreme. It certainly is a part of this region that's unusual, just because of the extremely hot summers and kind of miserable winters.

Swent: Did any of the changes in management, or upper level management, affect you at all?

Enderlin: Well, there were always changes. In fact, it would be interesting, one thing I--it would be a complicated task and one that would probably take a great deal of time--but it would be interesting to work out the management structure for every period in time through the life of a mine; constantly changing.

Swent: Yes, and they shifted from different management systems there just at McLaughlin, I believe, from having one person in charge of operations all over and another in charge of maintenance.

Enderlin: Yes, you know, when I was first hired on, Mike Attaway was mine superintendent. And I believe at that time he--let's see, Mike would have reported I believe straight to Jack, but that was changed. They started moving around, creating intermediate positions. And yes, it got complicated there for a while. That didn't affect me all that much at my particular level. But it's been a constant shuffle, constantly reassigning people, and I think that kind of goes with the business. And higher levels, too; our vice presidents were constantly changing as well. We have seen a lot of change there.

Swent: When did you start commuting from here?

Enderlin: Well, first of all I stopped staying in Lower Lake when I got married in 1994. So at that time I was living in Lower Chiles Valley, which is down by Lake Berryessa.

Swent: The other side.

Enderlin: So the other side, and then commuting up the Berryessa Knoxville Road, a very bumpy, wind-y, narrow little commute. But I got used to it. You tend to learn where the potholes are. A very enjoyable commute, actually, because it's so back country. You certainly don't have to worry too much about meeting too many cars. I did that up to the period where I was doing shift work as well at the mine, so it was a little bit weird commuting that thing in the wee hours of the morning.

Swent: I would think so.

Enderlin: That was my start at commuting, and then right around '96 I moved back to Calistoga here and started the commute over Mount St. Helena.

Swent: That's a long commute.

Enderlin: It's a little over an hour. But I look at others: Greg Brasel lived here in Calistoga as well, and he commuted every day. Ray Krauss has an even longer commute. But, yes, there's only a few of us that take this long a drive.

Swent: That's a lot of commuting.

Enderlin: Yes. Puts a lot of miles on things. But I turn on the radio in the morning and I hear the Bay Area traffic snarls and I don't feel so bad.

Swent: No. That's true. At least it's pleasant driving.

Enderlin: What amazes me, though, when I'm heading northbound over Mount St. Helena into Lake County, there is a steady stream of traffic heading southbound. This is at six o'clock in the morning. And at that time of day, if they're heading for an eight o'clock job, they're heading for San Francisco and points beyond. So you know Lake County has affordable housing.

Swent: Well, that Hidden Valley area has just boomed.

Enderlin: Hidden Valley, yes, yes. And people can afford to put in those kinds of commute hours to save on the expense of buying a home. Every morning we have our usual line of regulars that are all heading southbound.

Working in the Environmental Department

Swent: When did you get involved in the environmental side of things? Is that what we should move on to now?

Enderlin: Yes, it is. We pretty much covered the life of the Geology Department. You know, the Environmental Department, I hadn't been directly involved with at all. I certainly knew and worked with the people that were in the Environmental Department.

Swent: Let me ask you--what were the relationships? You mentioned and referred to it a little bit earlier. Ray Krauss has had his own--

Enderlin: He has his own realm.

Swent: His own very important realm, yes. Can you talk a bit about that?

Enderlin: Yes, you know, there was to some extent a separation between the mine end of things and the ore processing end of things at McLaughlin. I don't think it was as extreme as some operations can see. We had remarkably good communication and good rapport between the gold extraction people and the mine people, even though we referred to each other as the mill guys and the mine guys, or whatever. There was a distinction between the two, and it was rare for us to cross that line.

For instance, you wouldn't expect to see someone working in the mills to go out into the pit. Really, they had to be careful going out there anyway. Likewise, it wouldn't be appropriate for me to be walking around the autoclave area unsupervised, because I'm not familiar with that area for safety purposes. But from what I've heard from others, the communication and the rapport between the two groups was a very high level at McLaughlin. And I certainly was in the middle of that, because in ore control especially, we had to interact with all the folks at both ends, because ore control, the planning of lots and determining what to feed through the autoclaves, involved both sides equally. So we worked very closely there.

We would have regular meetings, at least weekly, to discuss strategies, to advise the folks at the processing end as to what to expect. You know, there would be times in the pit where we would be unable to provide optimal ore. We would have to warn them that, gosh, you know, we're hitting an area where there isn't enough pyrite for you, or there's an area where there's too much pyrite, and how are we going to blend this down so we don't cause a catastrophe in the autoclaves. We would try to always stay ahead of anticipated issues like that. And so a lot of meetings and a lot of communication. I was probably in a position, the Geology Department as a whole, was in a unique position where we bridged that divide between both ends.

I think the Environmental Department did the same thing. We were actually kind of separate entities that had reason to deal more with both sides of the operation than any other department, and so there was a parallel in that regard.

Ray's little realm would be the same thing, you might say. The Environmental Department would have to deal with both of us. I worked with the Environmental folks a lot, especially in the exploration, because any time we wanted to drill beyond the disturbance of the pit, we had to go through those things required for our permits, you know, whether it be a simple notification to the counties or whether it be something more complicated and more paperwork.

So I worked very closely with Dolora Koontz, who you have also interviewed, and who worked for Ray Krauss. That was my opportunity to kind of gain a feeling for how things work with the Environmental Department. Dolora's husband, Gary, was our mine chief surveyor, and so I worked closely with Gary, and so we had ties there. In fact I used to ride down the hill, ride home, with them when I was living in Lower Lake, quite often, so we were able to compare notes.

So that's kind of our, in terms of the ties between both ends. And the interaction with the Environmental Department wasn't that great. You know, we crossed paths a lot, but until I actually began cross-training under Dolora, I had no concept of how involved all of that work was. I simply knew the bits and pieces of her responsibilities.

How I came to move into the Environmental Department was kind of a surprise to me. As the point of mine closure approached, mine closure in 1996, I received my Warn Act Notice. Meaning that my services would come to an end. So as a geologist--I was working back in ore control at that point, since the exploration had come to an end, I was working in the pit with the crews again.

I was scheduled to be laid off, and making plans accordingly. It was not really a surprise; it was expected and accepted. But around sometime in late 1995, I think around November, Ray Krauss approached me to just kind of test the water to see if by chance I might be interested in moving into the Environmental Department if an opening should arise.

I think what Ray was looking at at that time was Dolora's departure. She had made it known to Ray that when Gary, her husband, got laid off as the Mine Survey Department was destined to do, just like me, that she would resign. And resign with good feelings. Certainly no animosity. But that that was their grand plan, that they would move on. Ray could see a big void developing in his department as a result of her departure. So I think Ray kind of tested the waters to see if I would be interested.

I guess in his mind, from talking to him, the sales point for bringing me into the department was that for post-mining issues, in addition to the routine scientific compliance issues, which any natural scientist can step in and fill that void, there would also be a greater need to understand geochemistry, to understand those issues that would come up with closure: the stability of the mine pit as it begins to fill with water; the stability of the waste rock dumps; and things that start to move back into a geological realm again.

And so it was, you know, it was just, the circumstances were right. Had Dolora chosen to stay, I'm sure the

Environmental Department would be functioning just fine. I would probably be here doing some vineyard work. And as it turned out, we were able to complete pretty much a seamless transition from Dolora to me. We were very fortunate in the spring of 1996, the mine group made arrangements to allow me to move out of ore control and cross-train under Dolora for a period of a couple months, just so that I would have the exposure I needed to be able to hit the ground running when she did finally depart.

Swent: Just for the record, we should say what she did. As you say, I did interview her; she was in charge of the monitoring.

Enderlin: Dolora was senior environmental engineer working under Ray Krauss. In addition to Dolora, there was Jim Jackson, who supervised the air quality end of things. Dolora was more permitting compliance for water quality purposes, and any other interaction with our local agencies that might be involved. Her function was to collect the data, assemble it into the reports, the annual and semiannual reports, and do that on an annual basis, being basically the extension of Ray's work.

Ray was involved primarily with interacting with the regulators, working on a proactive basis to deal with higher regulatory issues in the state, and so on.

Swent: You also then were working in a different place, because they were up by the processing plant.

Enderlin: Yes, Ray's office was in the old environmental, or the old administration building. Dolora's office and Jim Jackson's was located in a separate building. It was converted--

Swent: Up by the gate.

Enderlin: Converted office space. It was originally what was called the Davy McKee warehouse. And it was one of the whole series of warehouses that were set up during the period of construction with the mine, prior to mine operations, to accommodate all the contractors that worked on the mine project to assemble the mills, and do the initial dirt work, and so on.

Swent: You had been working down at the truck shop.

Enderlin: I had been working at the truck shop, so I moved into Dolora's office, the Davy McKee warehouse, and settled in there, but that didn't last too long, because eventually it was decided that all of our office spaces should be consolidated at the truck shop. So I moved back.

Swent: Moved back to the truck shop.

Enderlin: So of all the folks that are set up with their offices in the truck shop, I'm probably the most comfortable with it since that's been my office since day one.

Shall we take time off to eat? It's one o'clock.

[tape interruption--lunch break]

Swent: We had a lunch break here, and now we're back.

You're out of the pit. You're no longer in the pit.

Enderlin: I'm out of the pit. [chuckles] The pit was down to its last couple months of activity, and I had shifted to the environmental role, learning as much as possible from Dolora in her last period of time with the mine.

The transition into the Environmental Department wasn't too difficult just in understanding how the samples were taken. Probably the most difficult part was getting familiar with environmental laws, and all those things that I hadn't really been exposed to before. That took a lot of homework, a lot of reading to try to understand some of the fine points of the Clean Water Act, and that sort of thing.

One thing that we, in talking here over lunch, we had mentioned the PR. And another one of the roles that I had at the mine that lapped across from the Geology Department very easily and very effectively into the Environmental Department, and that was the Geology Department, along with the Environmental Department, had parallel and similar strengths with regard to public relations. Both departments were kind of the lead departments to go out into the community, or to guide special tours, to host professional groups at the mine site of a technical nature. Both of us had that sort of a tie that lent itself fairly well to a transition back and forth.

Swent: That surprises me a little, because normally I don't think geology departments get into that PR function.

Enderlin: Well, Norm Lehrman certainly started it.

Swent: Maybe this is because you have a talent.

Enderlin: Maybe. I don't know. Norm certainly, with his gift for giving inspirational speeches, was very popular. In fact, when he did move out of Lake County in 1993, he left a void in the community that I tried to fill. People really grew to expect that they would have, you know, lectures, talking about the mine, from Mr. Lehrman, and Mr. Lehrman wasn't there and Mr. Enderlin had to fill in.

But the same thing applies to the environmental front, too. This year I gave several public lectures: one dealing with bats and mine reclamation. Our Environmental Department has been involved with relocating a bat population at the mine, and the Geology Department was equally involved with it. We had the maps and an understanding of the mine workings. Dolora and the people in the Environmental Department had the ties to the bat researchers, such as Dixie Pierson, who is our lead person in terms of, she and her husband are the lead people doing the bat research and working in the successful relocation of that population.

Swent: Has that been ongoing?

Enderlin: Yes. Oh, I still do it. I picked up the banner where Dolora left off.

Swent: I knew it had been, but I thought that once they moved them that that was the end of it.

Enderlin: Like anything in environmental, once you accomplish what you set out to do, then you have to monitor it to assure that it doesn't, down the road, become a failure. Or, you know, to know, to determine what sort of results you'll have from it. So, yes, every year we do monitoring for those populations.

Swent: Oh, I didn't know that.

Enderlin: So like I say, this year I delivered a presentation on the bats. Certainly a geologist, stepping out of that shell to give a talk to what's basically a biological community, is quite a big step.

Swent: Where did you give this talk?

Enderlin: That one was given in St. Louis this year. And we also, last year, 1999--

Swent: This was to a major professional organization, then.

Enderlin: This was to a nationwide conference, mostly agency people, mostly dealing with coal mining reclamation, but looking at reclamation techniques to protect habitat for bats. It's a big deal right now, especially in the South, where the Indiana bat is one that's considered endangered.

We have never had to deal with an endangered species out at McLaughlin, but back in the coal country they are. And it's a big issue in terms of, not a voluntary program coming up with ideas like we did, but there it's in a regulatory context. They are trying to hold these symposia to compare notes and try to understand the pros and cons of a regulated aspect of managing bat populations. Of course any time it's in the regulatory context and prescribed, it becomes a little more complex in how to do it in such a way that it will be successful.

So we were very fortunate. The bat populations at McLaughlin were not initially recognized to be an issue in terms of the concerns over the wildlife, and it wasn't until Dixie just happened to come by in 1987, and just happened to meet up with Ray, that we even became aware that we had a sensitive population of bats in our tunnels. This turned out to be one of the biggest success stories we've had at the mine. The population has grown; we're not exactly sure why. We do know that the population has probably almost doubled since we relocated them.

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Enderlin: The bat population--our bats, the species we look at and are most interested in, although there's a variety of them at the mine. The one that we're most interested in is Townsend's. Townsend's big-eared bats. Ah, yes. Townsend's is a California species of special concern. So it does have some level of concern status, but it's not at this time considered endangered. Townsend's was investigated in the 1940s by a bat biologist who published their information in the early 1950s. And Dixie, when she came to the mine in 1987, was expecting to find an abandoned mercury mine, and instead found this enormous open-pit mining operation. It was very fortunate that she was able to touch bases with Ray, and we were able to find the location of the bats, still living in some of the old mine tunnels that were to be threatened by open-pit mining activity, and to relocate them to a stable area.

Anyway, the bat populations are something where we span the gap, the Environmental Department and the Geology Department. We both had a lot of fun with it. And I continue to have fun with it. There are some parallels there. And that was one of the papers I delivered this year.

The other one, and it's also a very important one, that was a talk that I gave this year, was to the Wildlife Habitat Council back in Baltimore. Homestake has been a member of the Wildlife Habitat Council for quite a few years. Ray was the one who originally contacted them for membership. It's a national organization focusing on large corporations. You've got all the Chevrons and all the big international-type corporations involved. In a way Homestake is kind of a little diminutive member when you compare it to some of the bigger corporations that are there but we're a very important member because of the size of our land holdings and because we're in the West, and so much of the lands that they are dealing with have been in the East, and they're moving their way across the country.

Anyway, in 1999 we were given the prestigious award of being the corporate habitat of the year. We beat out all the big ones. Part of the obligation of being corporate habitat of the year in 1999 is that one gets up and gives the talk in the year 2000 to explain how we did it. So anyway, that was a wonderful thing, too.

And those are--again, those are PR, those are getting up and being able to give a talk and to make it in such a way that people find it interesting, and that the geologist doesn't stand up there making a whole lot of mistakes. But it's fun. I have a good time giving the talks.

And we do a lot of that locally, too. In fact, it will be interesting in the transition that's ahead of us; as we move from Homestake to the University of California, it's going to be important for us, Homestake, to work with the Natural Reserve people to try to continue on that community involvement. Because we have become literally a center for academic knowledge. You know, if we don't know the answer, we have so many ties to people who do, that we can act as a referral service.

As an example, we had an earthquake in Napa this year--this last year, rather; 2000. And the press immediately called Homestake, you know, because, word of mouth, they know about us. They know that we've got geologists who have been active in the community. There are a lot of geologists in the area, but you know, we're the first one that comes to mind. And so we've built up a--

Swent: They didn't blame Homestake for causing the earthquake?

Enderlin: No, they didn't blame us at all. [laughter] It's limited what Homestake can explain about an earthquake down in Napa, but still it's interesting that of all the parties that they called first for input or insight, it's Homestake, and so we have created an interesting relationship with the community.

That's going to be a real challenge for us in the future, is to transfer that relationship to the University of California Natural Reserve system. And that can be done, I think, very easily; it's just a case of, like all transitions, to think it through as far in advance as we can, and kind of work out the details of how to do it. So it will be fun.

Swent: You're opening up a whole new career for yourself here.

Enderlin: In a way it's looking like, you know, I think, just like Ray has branched out, I think we never walk away from it entirely. You're always drawn back to it. It will be fun to see how it moves forward.

Even looking at the mine itself, and even though the open pit isn't operating, to see how all the planning that was done so many years ago has manifested itself in the end. You know, we plan and plan and plan these modern mines. You know, from a historical standpoint, you look back at these old quicksilver mines, the old silver mines, you knew the job was going to end when you showed up at the front gate and it was locked! [laughs] In these operations everything is so anticipated, and so scheduled years in advance, that, you know, barring something unforeseeable, it's a very well-orchestrated, almost too well-orchestrated system in terms of mine closures, to know that the mine is going to be closing in exactly X number of months is difficult in terms of managing a work force. When you talk with others who are involved in that aspect of keeping a work force and personnel, that becomes a real trick, because everybody knows the day when everything is going to happen, and when another job comes along they grab it.

Swent: Of course.

Enderlin: So it's a very different world. It's a very modern way of doing things and very efficient, but also is very different from the old ways.

Swent: Have you gotten involved at all, would you like to comment at all on the relationship with local politicians?

Enderlin: Well, it's only been in recent years I've had a chance to interact with a few of the local politicians, at least from the environmental standpoint. I've certainly had more exposure in recent years than I've ever had before, because I've always been shielded from them, and pretty much involved just with the matters at hand in the pit.

But, you know, certainly going up the ladder from agencies to politicians, the agency people that I'm working with, I'm very fortunate, too. Again, when you step into a role that has a track record so good, it makes it very easy to move into that. I can picture a very different relationship had Homestake not been so true to its word. I look at the county agencies, the Lake County, Napa County, and Yolo County, their development agencies or their planning departments, depending upon what they call them, and we have a wonderful rapport with them. So at that level it's great. And as you go up the line and branch out into other agencies, it's a very good relationship that we have built and nurtured through these years.

From a political standpoint, we have people like Mike Thompson who are a very good friend and a good advocate. And a lot of that is proactive. You know Homestake tries to "make ourselves known and do things that are unconventional." I think the Blue Ridge Berryessa Natural Area Conservation Partnership is an example of something that's above and beyond what would ever have been thought about for the mining company to initiate. This was a group of both public agency people, BLM, Bureau of Reclamation, Fish and Game, who are working with property owners and neighbors, as well as Homestake, in this grassroots group that's looking at the management destiny for over 300,000 acres of land. And McLaughlin is just one.

Swent: Do you have any idea how that came about; how that began?

Enderlin: Ray Krauss. [chuckles] To put it simply. Sure. You know, it's again--Ray has such vision that he's always looking ahead at not just the current situation and resting on laurels, but always thinking ahead. And really the mine needs to leave a legacy. And you'll hear this word more and more. Is that we need to get away from the old idea that the mine does its thing and leaves a mess. You know, here the whole goal is to create something that's better than was there before.

The Blue Ridge Partnership is one example of it. And there's nothing prescribed; there's nothing in any of our permits or regulatory requirements that say we have to go out to this level and do community outreach. But Ray considered what the next step should be to manage these lands and get everybody together at the table on this, and came up with this idea. It started out as a very small, informal meeting, and now all of a sudden it's grown. And politicians began to recognize it as these things do grow and begin to develop a life of their own. Now we've got strong advocates, strong friends, who are supportive of this, also realizing that this group is now a group of constituents who is quite eager to see them, you know, get involved with these programs.

Swent: What is your role with it?

Enderlin: Well, I try to attend the meetings whenever I can. We do meet in Yountville. My role right now is mostly involved with working with the university. That's where I can do the best. Ray is still kind of the chairman in charge of the whole thing to keep things moving. He's such a wonderful facilitator that he can step in and really keep the group together. Ray still acts for Homestake. He is an independent consultant, but he is still Homestake.

Swent: I thought perhaps you were designated as the Homestake representative.

Enderlin: Well, we go there, and others do, too; Scott Moore, our surveyor and a landowner in the Morgan Valley area, tries to attend whenever he can, too, as a partner, not as the leader in the group. We do try to attend and be a part of it all. But it's taken on a life of its own. You know, these things achieve a critical mass and they take off. Ray is certainly the one who jump-started it. And I'm sure now it has reached a point where it will continue. Homestake is a partner in it, and that's the way we should be. We don't want to be the leader, and shouldn't be the leader. It needs to be a group effort. So we have one part in this big picture now, which is kind of fun.

So like I say, what I'm looking at now, outside of the routine for sampling and compliance, and doing all those things that are part of the daily routine for environmental, on our front is trying to achieve a smooth transition to the university. One of my roles is to act as the liaison essentially for that transition to take place.

A lot of things are going on outside of my realm: the signing of the license agreements, and the conservation easements, and all those things are legal matters that I'm in the loop on, but I'm certainly not steering them. Where I can help the most is to help with the transition of scientific data, to familiarize the university folks with the names of our air quality stations, our meteorological data, what the databases look like, where they're stored, what files are available.

And all of this--you know, in my experience, fifteen years, but in terms of the mine experience, you know, eighteen, twenty years of information, is all on file. Somehow we need to steer everybody who's just coming into this for the first time to know where all the data is. That is kind of the big goal at hand to keep this transition smooth. And we've done that.

You know, we've still got several years of mining activity remaining, but we started a field station. We, with the Davy McKee warehouse, the former environmental building no longer in use, it was a logical next step to establish a UC presence. What better than to have overnight lodging available. A kitchen.

And so it is also well enough away from the mining activities, that it's not--we can clearly say this is not mining-related. You don't have to wear hard hats, steel-toed boots, safety glasses, and all those things. This is not MSHA [Mine Safety and Health Administration]. There is no mining-related situation around there. In fact we jokingly refer to that area around that field station as the Birkenstock zone, in relation to the footwear that people can wear, which in and around the working areas we would never be allowed to.

So that has worked very well. And that has allowed people from Davis and other campuses to stay overnight as they need to to conduct their research activities. It's just a small sampling of what we'll be able to provide later on, but it's a good start. By establishing that presence, now we can start to become familiar, Homestake can become familiar with the university's needs, while the university can become familiar with what Homestake has to offer. We can establish a good familiarity, and have a good solid relationship there to make that transition fairly simple in the next few years.

Swent: I'm sure it's a lot more complicated than it sounds on paper.

Enderlin: Well, we have some good folks in the university, too. Susan Harrison being one of those. Our reserve manager, Virginia Boucher, is another. Sid England. We have a variety of folks who are at the forefront of working with us from the university's end to also effect this transition.

Swent: MSHA is the Mine Safety and Health Administration; isn't it?

Enderlin: That's right. That's the federal agency that oversees our safety activities. We also on the state front have California OSHA, which has parallel interests, occupational.

Swent: Occupational Safety and Health Administration. You still have to think of them.

Enderlin: Both agencies oversee our activities. Some of their interests are parallel; some of them are quite different. MSHA is mining-related specifically, where OSHA is more industrial, general industrial issues.

Swent: I suppose that the fact that you are a local historian has given you a particular interest in all of this?

Enderlin: Oh, absolutely. I still--in a way this working at McLaughlin is a study in history in itself. And if you step back and think, you know, these other mines that I've looked at, the old historic mines, had there been someone on site who had collected information, and stored information, and kept track of the stories in great detail, how much richer these stories would be. As it is, I find myself scrambling to find all this information. So here's a chance where at McLaughlin we can in part steer it. We can actually kind of make sure that when the mine is long gone, there will be something for people to remember us by.

But one thing that's going to be different with a modern mine compared to the old ones is our reclamation methods are so effective and so complete, there will be very few remains of Homestake outside of the open pit. And so historic mills, and machinery, and that sort of thing will be fairly limited in its preservation. So it's better if we can record our stories and have them available in that regard.

Swent: The archaeologists won't have a lot to go on, will they?

Enderlin: Very little. You know, it's going to be a fairly clean end once the operation is done. Virtually all the structures outside of the old administration building, our warehouse and our laboratory, all other structures will be removed.

Swent: The core shed?

Enderlin: The core shed will probably be removed some day, although it will stay for now until we can determine a better facility to house the core collection, which stays on the property. So I haven't done a final tally on the total linear length of core that's stored in that facility, but it's well over fifty miles of core now. And it serves as a library. That's the other thing that's now gone. The McLaughlin deposit academically was an important deposit. And we were quite thorough in our mining of it, so there aren't really many available exposures of the rock that represents what was the McLaughlin deposit.

So the core collection fills in that void, in that the core bored through--it was, you know, a collection of bore samples from every part of the ore body at different depths, and precisely located, precisely surveyed so that if an interested geologist should wish to know what the rock looked like 500 feet below the surface at a given location, chances are they could do that.

And we've had several researchers already come through. Ross Sherlock with the University of Waterloo both worked for Homestake and also worked as a researcher at McLaughlin and ultimately got his Ph.D. using both his work in the pit and also going back and researching the core collection for needed information. So there's already an academic track record, a Ph.D.

We've also had some work at Davis trying to encourage the geology department there to take advantage of the collection and understand it. And we've had one research project from there. A number of other university researchers have come through from Stanford and from many other institutions. A lot of these research efforts are not specifically McLaughlin, but are part of regional research projects.

Perhaps the most unusual research project was when NASA-Ames Research showed up at the door to look at samples of rock from our hot springs terraces that contained fossilized bacterial remains. NASA-Ames showed up at the door, Jack Farmer, who has since moved on from NASA, whose title is exobiologist was involved in I guess a worldwide program of collecting photographic evidence for primitive life on earth. The most primitive. And bacteria certainly fall in that category. The purpose of the exercise was the Mars program. To think through, depending upon what sort of landers might be placed on Mars, how they would go about sampling and looking for evidence of life in the fossil form.

And so here we are in Lake County and Napa County, our little back door, and we had Mars researchers, NASA researchers, showing up to photo document our collections because we had this unique scientific information. And we still have preserved a good portion of that rock.

Swent: This is in the cores?

Enderlin: In the cores, and also in some of the larger samples that we've preserved and set aside. We have a rock collection that we fondly refer to as Stonehenge, that was set aside early on. Norm Lehrman and Jeff Wilson saw to it that key pieces of rock from different areas of the deposit be set aside and ultimately shipped to the core library area for display, just to represent the deposit.

Swent: Oh, that's the outdoor display.

Enderlin: The outdoor display. Yes.

Swent: That's a gorgeous thing.

Enderlin: And everyone that walks through there, you know, comments on it.

Swent: It's beautiful.

Enderlin: And it does represent sampling of rock that's now no longer available. All mined away. So those are the things, too, that we can work on. And the trick right now is to make sure that as much of our knowledge as possible gets passed on. And it's not a sad thing. It's actually exciting.

This is the part that is the real trick, is--you know, I look back at historic mining records, and from what I've seen--this is going back into the early mines--what typically happens is, the mine shuts down, all the paperwork is vandalized and lost. The miners run the course of their lives. They are gone. And there's no record of what happened. And enter the researcher who is tearing their hair out trying to piece together the story of a mine, with very few people around who know anything about it.

So we're going to try very hard to not let that happen at McLaughlin. And in the end, what we hope to create, you know--the gold mining, the mines always come to an end. But this is one that should be talked about for a long time. And that's the fun part, is to see how we can transfer the McLaughlin Mine into the Donald and Sylvia McLaughlin Reserve.

Swent: It has already begun.

Enderlin: It's begun, and it's going to work out very well. Yes.

Swent: Where do you see yourself?

Enderlin: That's the toughest part of the visioning project.

I suspect, and we'll have to see how things pan out, but certainly in 2002, after mining is complete and closure is well underway, Homestake is certainly not going to have a need for me full time there. And that will work out fine. I'm planning accordingly for that, and I think that will be in the best interest of everybody.

And I see a good chance that I will be working as a consultant, both for Homestake and other parties, just as Ray Krauss does now. He has completed his transition into that role and he seems to be doing quite well at it. And that's the way I picture myself--and as well as taking over the ranch.

I do want to get into the vineyard industry here. And the vineyard also lends itself in terms of schedules--none of this nine-to-five stuff, or seven-to-three, or whatever hours. The vineyard has periods where the work is very intense and very time-consuming, and other periods where you have a lot of free time on your hands. And I think that could work out very well for my plans. I would like to sit down and write and publish, and get some information out there.

Swent: You've done a lot of local history work that's very valuable.

Enderlin: I've compiled a lot, but I haven't published a lot. And I've had--state parks and local museums have all asked me when will I publish something. Not necessarily technical, but just general interest. Almost carrying on what we're already doing; getting up in front of public audiences and giving slide presentations and stories of the geology of Lake County, or the geology of Napa County, or the history of the mines.

And there's an enormous public interest just in general-interest-type geology and history, and I think there's an opportunity there to fill a very much-needed void. I know Norm Lehrman talked about doing that, too. And he may someday when he gets the time. I think we all have to put in that qualifier: When we get the time.

Swent: That's right.

Enderlin: Norm had talked about doing the same thing. So I hope that can happen. That would be well received.

Contributions to Museums in Lake and Napa Counties

Swent: I'd like to have you talk about the local museums and what you're doing with them.

Enderlin: Well, let's start in Lake County. Lake County has two museums. One is run by the historical society in Lakeport. They just recently acquired another facility, which I haven't visited; I believe it's in Upper Lake. There is some talk about expanding the collections, and I don't know that much about that yet. I know quite a few people that have worked in the museum there.

The one that is probably most closely involved with Homestake is the museum in Lower Lake. The old schoolhouse that is located on Morgan Valley Road, just as you approach the outskirts of Lower Lake, heading towards the McLaughlin Mine, was reopened a number of years ago as a museum, restored from a fairly poor condition into a fairly good condition now, and is a local museum of local history. Homestake has donated a collection of rocks, and I expect that as time goes by we will be donating more materials for their curatorship.

That museum has personal ties to me because my grandfather went to that school. Of course my grandfather had some bad experiences in that school, too. He had freckles, and the kids told him he looked like a chicken egg, and so he refused to go back to school; he ended up going to school elsewhere in the end. But anyway, at that museum, the Homestake Mine history will be an important part of their preservation.

Here in the Napa Valley we have several museums. We'll start at the top of the Valley.

We have the Sharpsteen Museum, which we work with very closely. The Sharpsteen Museum is located in Calistoga, and I guess the big contribution that Homestake has made for them is, again, the expertise to guide them in some of the exhibits. Most importantly I worked with them for the geothermal display: a three-dimensional geothermal exhibit that shows the underground of the Napa Valley, and how the geysers work, and that sort of thing. So we have been involved with them.

Farther down the Napa Valley is the Napa Valley Museum which has recently moved to a facility there in Yountville. It was in St. Helena. It has a collection on permanent loan of mining artifacts related to both Homestake and to the mines here in Calistoga.

Swent: Isn't some of it your personal collection?

Enderlin: It's my personal collection, yes. It also includes materials from the McLaughlin Mine as well, but not all of them are on display. There are some fabulous historical artifacts that are part of their collection.

Swent: I understand it's a wonderful collection.

Enderlin: They have done a wonderful job, too, and they have done a very good job with the geology. I'm very impressed with their work. They inherited a number of collections, including a fossil collection for this region, that is unrivaled. They have probably displayed it.

Collaboration with Universities, Colleges, and Junior Colleges

Enderlin: Those are the main museums we have worked with. We have also worked with universities: Sonoma State University, certainly the University of California at Davis, UC Berkeley, and even a little bit farther afield, the Colorado School of Mines, and some of the local junior colleges. We have either given information in whatever form that they want, or donating rock collections, and whatever.

Davis received probably the greatest geology gift, in that they received a collection of the best of our rock collecting through the years, all of our minerals. We opened the door and let the geology department take for their curatorship whatever they felt would be valuable to preserve.

So that has happened. Sonoma State University has received a sizeable collection, too.

Swent: And Sac[ramento] State also; didn't you have a connection there?

Enderlin: Sac State from Corporate, not directly from McLaughlin. Yes, Sac State has a laboratory that was built based on, or as a result of Homestake's contributions, but that was done through Corporate. Those are yet other activities, but not directly from this mine.

McLaughlin Mine Newsletter, "The Gold Piece"

Swent: You mentioned these great articles that you have written through the years for Homestake. You were playing quite a role in their publication--what was it called, the "Gold Piece?"

Enderlin: The "Gold Piece." Well, I'm still writing those articles. In fact, I think you're probably two articles behind now.

Swent: I guess so. And I wasn't aware of it for a while, I'm ashamed to say.

Enderlin: Well, I think when I brought it to your attention that most or all of the Homestake operations publish an internal newsletter, and it's done infrequently. Ours used to be done during the construction phase, I think, monthly. That was before my time. Eventually it was more of a quarterly, and now it's whenever our editor can find enough articles to pull together.

From a historian's standpoint, I think the mine newsletters are a key piece of information on the living mine that needs to be preserved. I hope that at all the properties, whether it be at Lead, Ruby Hill, up in Eskay Creek, I think we have all got our newsletters, called by different names.

Ours at McLaughlin is the "Gold Piece." They reflect a sampling of the life of the mine and go into details that historians would find very difficult to ever find under normal channels of research. Information on the ball teams: you know, whose kids are playing, and that sort of thing. The detail of the lives of the miners is something that is preserved in these things, that is very valuable from a historical standpoint.

The one thing that we have tried to do with the "Gold Piece" in recent years, and people have really enjoyed it, the people working at the mine, is to not just give rehashes of what we did during the last quarter, or whatever, or looking ahead--those are all important parts to the paper--but try to give people a little more of a feel for their place in the grand scheme of things. We have done a series of articles. Again, Norm Lehrman started these sorts of things. Norm did a fabulous set of articles in 1987, I think, 1988, describing the geology that we knew then, in layman's terms. Wonderful papers, written in such a way that everyone could understand it, and enjoy it, and get a grasp of the geology at the mine that they were working in.

History is the other very appealing topic that people love to read about. We're always curious about what was here before us. And certainly working in the mine you know that you're in an old mining district; you know that there are old tunnels and furnaces and things all over the district, but it's very difficult to find the stories behind them. So I've tried to do that in the "Gold Piece," to write a few little papers dealing with different topics, to kind of give our place in the mining history and history of the region.

We're still continuing those papers. We reached a point where we had pretty much run the gamut of the mining history starting back in the 1860s and working up to the present. Now we're doing more topics related to local history, not specifically mining, to understand why features such as Morgan Valley are named Morgan Valley. Who was Morgan? Hunting Creek that flows by the mine; why is it named Hunting Creek? Just simple questions like that so people can enjoy a little more of their surrounding.

Our most recent article was on the Zodiac Killer. The Zodiac sill, that we have mentioned in the course of our conversation today, was named by the One Shot Mining Company people, because when they were actively working in the area there was a serial killer on the loose in this region. I remember it; I was only a kid going to the local elementary school. The Zodiac Killer had threatened to kidnap a bus full of school children and kill them, and so here I was going to school. A lot of us working at the mine that are locals remember it very well. So I thought, well, why not tell that tale and how it relates to the mine.

The story there was that in the northern part of the mine workings that the One Shot Mining Company was operating, some of those workings had collapsed during the course of their ownership and they desired to reopen it. Bill Wilder loves to tell this story, and I think actually recounted it in his interview, that he or one of the group was lowered into these mine workings. The portal, the entrance to the main tunnel that went back into these workings, had collapsed, but there was still an opening to a shaft that allowed a person to be lowered by means of a winch or a windlass down into these mine workings to explore it. A crazy notion to try and do this, but they, for whatever the reason, wanted to go underground. When this person was lowered into the mine workings, what was found was that someone had been living in them, and their greatest fear was that this someone might have still been in there and had been dead from starvation. It turned out they weren't.

They felt convinced that after looking over the scene, what they were finding was the lair of the Zodiac Killer, so this hill where these mine workings was located was given that name, the Zodiac. As a result, that hill, and a lot of the others were named--the names persisted after the One Shot Mining Company had left, and we continued to use those names during the course of mine working.

Ask Pat Purtell what he thinks of Zodiac ore and he'll give you a whole treatise on how horrible the stuff was to process. The Zodiac rock, the volcanic rock of Zodiac Hill, was a very tough rock and difficult to mill. The mill people refer to it as “critical” rock. It grinds down so far and it won't grind down any further; it just rattles around like marbles. So it's a hated term, but I felt that everyone should know why--what this term is that they hate so much. [chuckles]

So the "Gold Piece" will continue. As I say, it's a wonderful piece of the mine's history that will be nice to chronicle.

Swent: It's certainly valuable to have that.

Will There Be Another McLaughlin Mine?

Swent: Well, Dean, I think we have pretty well covered the territory. Is there anything else that you would like to add?

Enderlin: Well, one topic I think that everyone asks, and I have given the answer a lot, and it's worth discussion, is: Why didn't we find another McLaughlin in the region? It's probably one of the biggest questions that everyone asks.

Swent: Oh, of course, and closer to town.

Enderlin: Closer to town. [laughter]

Swent: Why did you put it out there?

Enderlin: Yes. Well, that always comes up. [laughter]

You know, for all the years that we worked here, people have rightfully wondered, is there a chance of another gold deposit in this region? We certainly had many legions of geologists casing this landscape looking, and many fine folks have put their brains to the test to try to come up with ideas for why McLaughlin is where it is, why it seems to be alone in this region. It's an interesting question that we think we have an answer to, and of course geologists are ever the optimists.

There's always a chance there's another one out there, but we never found it. The McLaughlin deposit does have very close cousins, you might say, in a geological context. The Palisade Mine that we talked about today was one example. The Palisade Mine was a silver mine. It produced well over 1 million ounces of silver, and probably about 10- to 15,000 ounces of gold.

The mine up at Sulphur Creek was another one which certainly had a lot of gold in it. I don't know the exact production up there; the records are pretty poor, but certainly they produced gold there. And the Silverado Mine up on Mount St. Helena, which is very closely tied to the Palisade Mine.

What we found was that the processes that form these gold deposits were widespread. There are other close cousins to the McLaughlin Mine, but for whatever the reason, all of the ingredients that make for a large gold deposit were not met. It's like a cookbook. You have to have all the ingredients, and if one is missing, you may not have a world class gold mine.

So for instance at Cherry Hill, the gold there is fabulous. You can see it in the rock, but there are very few veins. Little tiny stringers of quartz here and there, and not enough to add up to any tonnage. At the Silverado Mine you have one big vein thirty feet thick, compared to the veins around McLaughlin that are two inches thick. Very high grade, but not--only one vein. So once it was mined out, that was it. Where to look next. And as a result, after three years of mining they were done.

The Palisade Mine, which was larger, had multiple veins, but again, the indication was that these were quieter systems. The geology was not as violent, not as nasty as it was at McLaughlin. It took nasty geological conditions to create such an enormous gold mine.

The modern day analog that is still making gold is the Geysers. In Lake County the one area that people talk of when they're not talking about Homestake in terms of industry, is the Geysers geothermal area located off to the west side of Clear Lake. The Geysers is the modern day equivalent of what McLaughlin was a million years ago. It's a hot, steamy landscape. There's a lot less water flowing at the Geysers than would have been flowing at the McLaughlin Mine when it was forming. McLaughlin was an Ice Age deposit, and there was water flowing all over the place. It looked more like a Yellowstone Park than at the Geysers, with steaming ground. And it's that hot water that moves the gold around. You have to, in order to transport gold, dissolve it in hot water. It has to have water to make it move; gas vapors and steam don't cut it.

So what we came away realizing is that the mercury and the gold systems are very closely tied, that if you have a gold deposit in the Coast Ranges, there's mercury nearby. There's mercury associated with all of them, but at the same time, if you have a mercury deposit, you need not have gold associated with it. The reasoning being, that mercury can be transported as a gas, and you don't have to have the hot water. So within all these mercury deposits, only a select few actually had gold systems beneath them, and the Geysers is one of those that has some gold. The problem is it's a vapor-dominated system. The vapors that produce the pressure that power the turbines that generate the electricity are wonderful for steam generation and wonderful for producing electricity, but there's very little water moving through that landscape.

I guess the order that we need to put in to the weather people is to create a climate that's more like an Ice Age to get that kind of water moving around through the landscape to turn the geysers into a Yellowstone like McLaughlin was.

Swent: And then wait a million years.

Enderlin: And then wait a few million years. But we geologists, we're patient souls. We can do that.

Swent: So you don't think that you're going to find another McLaughlin tomorrow?

Enderlin: We won't find another McLaughlin, but there may be other deposits yet to be found. It's just a matter of the right concept, the right things to look for in order to find one.

McLaughlin, in retrospect--and 20/20 hindsight is a wonderful thing--McLaughlin in retrospect, if you look at the historic satellite images, the McLaughlin outcrop appears as a big white spot. It's like an ore body waiting to be found. It is glaring in its exposure. Even from the landsat images, the satellite images before the open-pit disturbance. Yes, looking back at it, it's so obvious to us today, and yet for so many years it was thought that it didn't exist.

Swent: That was pretty remote.

Enderlin: Yes, from a historian's standpoint there are probably other reasons why the gold deposits in the Coast Ranges weren't considered very seriously, and that goes back to Professor Whitney again. I would love to find it in print where he was quoted, but he was--I have yet to find a direct writing of his that states it, but he was widely quoted as stating that his opinion was that gold in economic quantities could never be found in the Coast Ranges of California. Somewhere he made a dogmatic comment that stuck, and actually interfered with the development of a lot of the local silver mines, including the Palisade. It was difficult for them to seek funding from investors because Professor Whitney's words were considered the gospel, and therefore why bother, why invest; these people would obviously be frauds for even thinking that gold could exist in the Coast Ranges. It's all in the state of mind sometimes.

Swent: And the power of the press even then.

Enderlin: The power of the press. Very strong, very influential. So who knows? It will remain to be seen what we find next.

Swent: Geologists are always optimistic, aren't they?

Enderlin: Always optimistic. We wouldn't be employed very long if we weren't. The last thing you want on your staff is a pessimistic geologist.

Swent: Impossible. An oxymoron.

Enderlin: It's an oxymoron. [laughter]

Swent: Oh, yes. Well, this has been wonderful, Dean. I'm enjoying looking out at your vineyard there.

Enderlin: And watching the rain.

Swent: And watching the rain. Does that just about wind it up?

Enderlin: I believe we've covered it all.

Swent: I think it does. This has been just great. Okay.

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Western Mining in the Twentieth Century Series
Knoxville/McLaughlin Project

Susan Harrison

MCLAUGHLIN NATURAL RESERVE

An Interview Conducted by
Eleanor Swent
in 2000

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Susan Harrison at Homestake.

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INTERVIEW HISTORY--Susan Harrison

Professor Susan Harrison is director of the Natural Reserve System at the University of California at Davis, including the Donald and Sylvia McLaughlin Natural Reserve, the former McLaughlin Mine site. She is a world-renowned conservation ecologist, with special expertise in fragmentation of serpentine habitats, and is a dedicated research scientist and teacher as well as an effective public advocate for the protection of fragile ecological areas. She has worked to have the Knoxville area designated as an Area of Critical Environmental Concern [ACEC] by the Bureau of Land Management.

Her connection to the site began when as an undergraduate at UC Davis, she served as the student member of the Campus Advisory Committee to the Natural Reserve System, formed a serpentine subcommittee, and looked at various serpentine habitats. As she says in her oral history:

> We sort of fell in love with it back then in 1986....this site that we called Morgan Valley was the best of all the sites we looked at. It was the only one that had full range of habitats, all nine of the butterfly species, just generally really high diversity of the flora and fauna....There's a serpentine wetland there, there's a hill that has a whole series of springs that feed little streams that come down, there are a lot of rare plants that are concentrated in this one place, and it's just a very attractive spot, too.

Acquisition of the reserve was approved by the University of California Board of Regents in July 1992. The Fall 1992 issue of the Natural Reserve System [NRS] publication, "Transect," in announcing the acquisition, said, "It offers unparalleled opportunities for environmental research and the potential for a new environmental research center at the site of one of the nation's most innovative gold mines." On 2 May 1993 a reception was held at the Hearst Mining Building on the University of California campus in honor of NRS and its newest reserve. Guests included representatives from the universities at Berkeley and Davis as well as NRS, Homestake Mining Company, California Mining Association, and the State of California Department of Conservation.

I finally became acquainted with Susan Harrison on 22 April 1999 when I accompanied Sylvia McLaughlin to Davis for a field trip to the McLaughlin Reserve. We had dinner with Susan, her husband, Phil Ward, a zoologist and ant specialist, and Liza Riddle of the Natural Reserve System, all of them impressive for their intelligence and enthusiasm for their work. The following day we toured the reserve with representatives from NRS and UC Davis. Even though I had seen it many times before, the natural beauty of the place--April flowers were at their peak--was exhilarating, and it was even more exciting to see it being put to this new use by students with butterfly nets and note pads, in groups out in the field and along the road, gathered at the core shed, and at the newly-named Ray Krauss Field Station.

In October 1999 Susan Harrison invited me to speak about the Knoxville District/McLaughlin Mine history to a graduate seminar at UC Davis on Environmental Science and Policy. Then I saw again how effectively she stimulates intellectual excitement and curiosity in her students. I was delighted when she consented to find time in her very busy schedule to come to Berkeley for an interview to complete the story of the McLaughlin Mine. She came well prepared, with some notes, and was a relaxed and articulate narrator. She has been generous in donating supplementary documents and photos to enhance our project.

She is unassuming, unpretentious, and casual, but her interview makes it clear that she is a very serious scientist, combining clear thinking with global social concern. She has traveled widely and been influenced by Rachel Carson and Paul Ehrlich as well as loving parents. She has done research in Kenya, Panama, Costa Rica, and England, on deforestation and water issues as well as her specialty, butterflies and metapopulation theory. She still shows a spark of irritation at one summer assignment in Alaska which was not up to her standards; she does not like to waste her efforts. She enjoys teaching, especially to students who can think as deeply as she does. In her interview, she talks about teaching an undergraduate ecology class:

> The answer to all important questions in ecology is: It depends. And what you need to do is learn to ask the next question, which is: What does it depend on?....I think the average student isn't happy with really having to deal with all that uncertainty and thinking for themselves. They would like to have some simple take-home message at the end of the lecture. So it's hard to strike a balance between giving people some simple messages that they can feel good about, and some concrete information that is interesting and useful, and then also introducing them to these complex ideas that don't have answers.

She speaks to her own education about the importance of mining:

> I'm pretty much a convert to the point of view that Ray [Krauss] has been doggedly advocating all along: that mining is important, and it's important to do it in a way that sets a better standard for mines in general.

The interview was conducted on 15 December 2000 in the conference room of The Bancroft Library, beginning in the morning and continuing in the afternoon after a lunch break. The tapes were transcribed and the lightly edited transcript was sent to Susan Harrison for review on 26 February. She returned the transcript within a few days with no changes and a few corrections of spelling. The manuscript was amended and indexed at our office. The tapes are deposited in The Bancroft Library and are available for study. An additional folder of supplementary materials relating to the acquisition of the McLaughlin Natural Reserve by the University of California are deposited in The Bancroft Library.

The Susan Harrison interview is one of more than forty interviews which were conducted by the Regional Oral History Office from 1993-2001 in order to document the development of the McLaughlin gold mine in the Knoxville District of Lake, Napa, and Yolo Counties, California, from 1978-2000, as part of the ongoing oral history series devoted to Western Mining in the Twentieth Century. The Regional Oral History Office was established in 1954 to record the lives of persons who have contributed significantly to the history of California and the West. The office is under the direction of Richard Cándida Smith, Director, and the administrative direction of Charles B. Faulhaber, The James D. Hart Director of The Bancroft Library, University of California, Berkeley.

Eleanor Swent, Project Director, Research Interviewer/Editor

August 2001
Regional Oral History Office
The Bancroft Library
University of California, Berkeley

Regional Oral History Office
Room 486 The Bancroft Library

University of California
Berkeley, California 94720

BIOGRAPHICAL INFORMATION

(Please write clearly. Use black ink.)

Your full name Susan Patricia Harrison

Date of birth 10-3-61 Birthplace Sonoma, Calif.

Father's full name Paul Philip Harrison

Occupation Physician Birthplace Bad Axe, Mich.

Mother's full name Adele Sohn Harrison

Occupation Volunteer community worker Birthplace Berrien Springs, Mich

Your spouse Philip Stevenson Ward

Occupation Professor of entomology Birthplace London, England

Your children none

Where did you grow up? Sonoma, Calif.

Present community Davis, Calif.

Education BS, Zoology, UC Davis (1983); MS, Ecology, UC Davis (1986); PhD, Biology, Stanford (1989)

Occupation(s) Professor of Environmental Science and Policy, UC Davis (1991-present)

Areas of expertise Ecology and conservation biology, especially of plants on serpentine soils; ecology of Calif. oak woodland, grassland and chaparral

Other interests or activities Travel, hiking, camping, cross-country skiing, history, literature

Organizations in which you are active Land Trust of Napa County, various professional societies

SIGNATURE

DATE: 3-6-01

INTERVIEW WITH SUSAN HARRISON

A Family Doctor's Family in Sonoma, California

[Date of Interview: December 15, 2000] ##[1]

Swent: Let's begin with the basic biographical information. Would you like to tell us where you were born, and when?

Harrison: Okay. I was born in Sonoma, California, on October 3rd, 1961.

Swent: Tell me a little bit about your family. I think it's interesting that you come from a large family.

Harrison: A large family. My parents came from Michigan to California in about 1954. My father was a physician, a family doctor, and I came from a family of six kids. I'm the youngest of six. Two eldest sisters and then three brothers and then me.

Swent: So your father was kind of a life scientist, too.

Harrison: Yes, yes, and also a very outdoors-y person. He came very much from the tradition of hunting and fishing and hiking and camping, and we did all those things when I was a kid. I certainly grew up under a lot of influence of my three eldest brothers, since my two sisters were so much older than me that they were pretty much out of the house by the time I was consciously growing up. I had a lot of brotherly influence, and I sort of grew up emulating all their outdoors-y kinds of activities. My brothers all hunted and fished and hiked and camped and things like that, too.

Swent: Do you know why your family came from Michigan to California?

Harrison: Oh, the climate. [laughter] My father said he didn't care if he ever saw snowy winter again. But he was very much of a small-town person, and he wanted to settle someplace small and rural, like the place he grew up. Back then, Sonoma was quite small and rural. It was just a couple of thousand people. My mother wanted to settle someplace slightly larger, like Santa Rosa, but I think he won out. And, of course, now Sonoma is a bigger and more sophisticated place by far than it was back then.

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[1] ## This symbol indicates that a tape or tape segment has begun or ended. A guide to the tapes follows the transcripts.

Swent: Did your parents lament these changes as they saw them coming?

Harrison: Well, in some ways, yes. In fact, my early experiences of environmentalism had to do with my father's involvement in local environmental issues. He was part of a group that was a very early environmental group, in the early 1960s. They called themselves Valley of the Moon, Incorporated. They formed to prevent a freeway from being put through the Sonoma Valley. CalTrans decided that that would be a new commuting route from the Bay Area north. This group formed and fought it, successfully, and prevented Highway 12 from being turned into a freeway. This was when I was really, really young.

A little bit later he was involved in, let's see, opposing the Warm Springs Dam, which of course was an unsuccessful attempt, because we now have a Warm Springs Dam, but that--people were opposing it on the grounds that it would fuel a lot of growth and urbanization. And he was on the Planning Commission and involved in getting Sonoma's first general plan passed. So I remember a lot of my formative years, him coming home from Planning Commission meetings and things, and talking about environmental issues.

He didn't approach it as a scientist or, say, an ecologist but more from the perspective of just open space and just rural quality of life kinds of things. Didn't want to see it all get suburbanized. That was certainly formative for me.

Swent: I'm sure it was. What about your mother?

Harrison: She had the same sorts of views, but not as actively. She came very much from a kind of social service tradition, very church oriented. Just about the time my brother and I were in high school, and so she wasn't being a full-time mom anymore, she and some other people founded a group, a branch of a group called FISH, a social service kind of volunteer organization. She's been the coordinator of the Sonoma FISH group now for twenty-five years. She works forty hours a week or more, easily, on coordinating this group of about a hundred volunteers. They do all the sorts of--you know, food and clothing and rides and help for needy people kinds of activities.

So I also grew up with a lot of that influence, hearing about the fact that even in a relatively wealthy, affluent place like Sonoma, there's also chronic problems, and a lot of the problems have to do with people who are passing through: transients, homeless people, and so on. And she has always been very involved in that.

Swent: What does FISH mean? Is it an acronym?

Harrison: Yes. Well, it's a religious derivation because the Greek acronym for Jesus Christ, Son of God, Savior, spells FISH, and so it has been used as a Christian symbol, of course, for a long time, but the Sonoma FISH group is--even though the name comes from that origin, it's not a religious group per se. There are many people from other religions or no religion who belong to it, so it's not religious in itself.

One thing that I guess has probably influenced me a lot, too, is that she has always struggled with her religious beliefs. I think she realized at an early age that she was very attached to the concept of belonging to a church as a community, but also didn't really believe in some of the essential tenets of religion, like the idea of a personal male patriarchal God who looks after you and knows what you're doing. And so I think I've grown up thinking a lot about those issues as well: what aspects of religion come from, just things that people need to have in their lives, and how to deal with that if it so happens that you don't have a belief in a God.

Swent: What church did she belong to?

Harrison: Lutheran.

Swent: I see.

Harrison: But I was telling you before that I have a specific first memory of ecology, and here's my specific first memory of--I should say environmental issues. Maybe in some sense both. At any rate, when I was about seven or eight years old, I saw this book lying around the house, and it was a striking looking book because it had a big black bomb on the cover. The title was *The Population Bomb*. This was the book by Paul Ehrlich that said: Hey, look, everybody, the planet is getting overpopulated, and civilization as we know it is going to end in a few years' time if we don't stop this overpopulation.

Of course, I was a kid. I didn't know what was going on. But I saw this book with a bomb on the cover, and so I asked my mom what it was about, and she told me that it was a book about how people were having too many kids--

Swent: And you were the sixth child.

Harrison: I was the sixth child. I took this rather personally, and I really thought about it, and I could tell by the way they talked about it that my parents thought that this guy had a good point, and so it kind of sunk in. And so when, years later, I became Paul Ehrlich's graduate student, I felt it was kind of foreordained.

Swent: So you did study with him, then.

Harrison: Yes, yes, I was his Ph.D. student. And I told him that story. He just sort of laughed. Sounded a little bit apologetic, maybe.

Swent: Well, that book was a powerful influence on all of us, I think.

Harrison: Yes, yes. As I remember my mom saying at the time, it was something that seems obvious now but back at the time it wasn't in the popular consciousness, the idea that there could be too many people. I certainly grew up with the belief that in some sense times are getting better and better all the time. Civilization is progressing, people are happier and better off, and that will inevitably keep progressing. And so for somebody to say: No, we've hit a limit and things are going to get worse was a pretty drastic message. There's a logic to it that I think a lot of people felt couldn't be denied.

Swent: That's right. It was a truly revolutionary book. I don't recall when it was published, but it must have been late fifties or early sixties?

Harrison: No, it was about '67 or '68. A bit later. So Rachel Carson came first.

Swent: I was thinking that Rachel Carson and Paul Ehrlich were the two that really crystallized so much of that awareness.

Harrison: Yes.

Swent: Tell me your father's and mother's names.

Harrison: My father was Paul Harrison, and my mother is Adele.

Swent: Okay. So you graduated then--you went all through the Sonoma schools?

Harrison: Yes. Went to Sonoma Valley High School and all.

Swent: How many were in your high school class?

Harrison: Oh, I think--well, in the class I'm not sure. The total student body was about a thousand or twelve hundred, I think, something like that. It wasn't real small. It was very white and middle class. It was really an interesting experience to leave Sonoma and go places that were more diverse.

Zoology Major, University of California at Davis

Swent: Were you interested in science in high school?

Harrison: No. Actually, that was another thing that happened later. In fact, I think I grew up unconsciously absorbing the attitude that boys did science and girls did humanities. I always enjoyed English and sort of reading and writing and history and things like that. I always assumed that was the kind of stuff I was supposed to do. It wasn't until partway through college that I realized I could be a scientist if I wanted to, and that was also kind of an exciting moment in my life.

I went to [University of California at] Davis and originally thought maybe of going into journalism, but all my friends in the dorms were taking Chem 1A and seeming really stressed about it. It was a big thing, taking chemistry. Everyone was sort of scared about it. So I thought, *Well, maybe I'll take it, just to see what it's like*. Then I did really well in the class. Got a letter from the professor, congratulating me. It was one of those moments that I think changed my life because I suddenly realized that I could do well in science, and I had always liked animals and the outdoors and things like that, and I ended up becoming a zoology major. I think it was just much more exciting to succeed in a hard science than it was at the time to do well in a humanities class, just because of the expectations.

Swent: Were there any teachers in high school or at Davis that you would particularly like to single out?

Harrison: There was one high school teacher who tried to teach us some ecology, and I do sort of have some good memories of that class, but I guess it didn't really completely sink in with me at the time. And unfortunately, the main thing I remember about my undergraduate years is how sort of lost you could be at a big university. So I took all these classes and enjoyed them, but there was never anybody that sort of singled me out or ever suggested to me that, gee, you could be a researcher if you want, or anything like that, so I meandered my way through a zoology degree without ever having any idea of what research was like or the concept of getting involved in it myself.

So by the time I was finishing my undergraduate degree and wondering what to do with it, I came up with the idea of going to medical school. I had all these great reasons for it, like I was going to go to the Third World and save people from illnesses and things like that. But in retrospect, I can see it was more a decision I made with my head than my heart. I never really stopped to ask myself things like do I want to be around hospitals a lot, and do I really enjoy being around sick people, and am I naturally that sort of person who would do well at that.

And didn't really think about research very much, because I just hadn't had that experience, so I applied to medical school and was accepted, and planned to go off--by the time I graduated, which was in spring of 1983, I was all set to go off to UC San Diego to medical school. But then, just about that time, just about the time I graduated, I started meeting some people who were graduate students in the field sciences, in ecology and evolution, and also some young professors who were very friendly and approachable.

I guess another just lucky little twist in my fate, I suppose, is that I had a job working for the experimental college on campus, as their publicity person, and I sort of got bored with the job and stopped putting much effort into it, so they fired me, and so I had to look for a new job. One of these young ecology professors, a fellow named Rick [Richard] Karban, hired me as his field assistant. So in the summer of 1983, which was supposed to be my summer in between being an undergraduate and going to medical school, I spent the summer working out at Bodega Marine Reserve with Rick.

That was really a revelation. That was a really wonderful turning point in my life. I had never really at all understood the process of doing science and the idea that you could actually be outdoors, enjoying nature, and at the same time thinking about it and coming up with ideas about it and combining an aesthetic and analytic appreciation of nature. It was all just a total revelation for me. I just absolutely had a thrilling summer.

Rick was a great guy to work for because he would always just let me decide how to do things. I would ask him what I was supposed to do that day, and he would say, "Well, what do you think?" So there was a lot of creativity and a lot of I guess you could say self-confidence building that came out of that.

Swent: What sorts of things were you doing?

Harrison: His study is insect communities, different species of insects sharing the same host plants, so he was studying a plant that grows along the coastal cliffs of Bodega that had about three or four different species of insects that exploit it in different ways. He was looking at how much those insects affect each other and what determines their relative abundance, how much they compete with each other, and things like that.

And so the experiments consisted of things like putting little bags over plants and putting some insects in or taking them out or measuring them, things like that. So doing experiments, but doing them outdoors in this absolutely stunning location and spending hours lying on your belly, in the middle of a coastal grassland, counting insects on plants. It was all just wonderful fun. And really thought provoking.

Just some of the things I learned about natural history that I'd never known before really got me excited, too. I remember parasitoids were just a revelation to me. Parasitoids are insects that make their living by attacking other species of insects, laying their eggs on them, and then the larva of the parasitoid, which is usually either a wasp or a fly, slowly devours the host insect until the host insect dies and the parasitoid larva turns into a pupa and then into an adult.

To go out and collect caterpillars and watch them slowly die and then these flies come out of them--I just remember what an amazing experience that was. I was like a little eight-year-old kid again when some of these things happened. And collecting things and identifying them, all the natural history things which--in retrospect, I wish I had done more of that when I was a kid, but nobody turned me on to natural history at an earlier age, so I was kind of having a great experience on a lot of fronts.

And still I never really thought about graduate school. At the end of the summer, I went down to San Diego to find a place to live, and looked around, stayed with a friend, found a place to live, just was hating it the whole time, just really didn't like San Diego, felt really sort of agitated and unhappy, to the point that I left my friend's house to come back to Davis at midnight because I was just feeling so agitated.

So I was driving up Highway 5 in my little pickup truck in the middle of the night, and there was a thunderstorm over the Tehachapi Mountains, and I remember just at that point it finally struck me that I was making a mistake and I didn't want to go to medical school.

Swent: Oh, my.

Harrison: I drove back to Davis and told some friends about this and burst into tears. The next day, I wrote a letter to the medical school, asking if my admission could be deferred for a year, and they never wrote back to me, and I never wrote back to them, and that was that. And I spent the next year working for Rick, and I also had some various research assistant jobs with other professors on campus. Altogether, I had about five different jobs that year, so I had a great time. I was a completely free agent, working in these different projects.

I was a marine biologist, a primatologist, an entomologist, and sort of doing all these things as an assistant for a year. I even started my own research project on these caterpillars and parasitoids at Bodega.

Swent: I noticed you had a lot of work on butterflies.

Harrison: Yes, yes, that's where that got started.

That year was wonderful. It gave me the chance to experience being a researcher without any investment. So then the next year I enrolled as a graduate student with Rick at Davis, and by then I already had some research started. I remember at the time it seemed really important to me, the idea of being kind of a step ahead of the game. I guess I've always been kind of an insecure person, so if I were just starting graduate school without knowing what I was doing, I'm not sure I would have liked it as much, but I started it already having a project going and feeling like I had my feet on the ground a little bit.

And another person who was influential around that time a lot was Art Shapiro, who was our campus butterfly genius. Knows everything. He's really *the* expert on California butterflies. Knows everything about them. And he's a great fan of serpentine soil and a great natural historian. I think it was partly through him that I got interested both in butterflies and in serpentine and the unusual ecological communities found on serpentine.

Thinking back on that whole period, I think I was just so impressionable because it was all so new that everything I learned about back then has stuck with me. Even some things that submerged for a while have reemerged later, because those things left such a deep impression.

Swent: And came into play--

Harrison: That's right. And certainly both serpentine and the McLaughlin Reserve fall in that category. It was also just about that time, in 1984 and 1985, that I first became involved in the Natural Reserve System and ultimately what has since become the McLaughlin Reserve.

Swent: I want to go back and ask about jobs. Did you have summer jobs when you were in college? You mentioned this one at Bodega Bay, but prior to that had you had?

Harrison: I did, yes. One summer I actually did set out to try to get some biological research experience. It did cross my mind that research and biology would be a fun thing to do. Unfortunately, I made kind of a bad choice. I was in a class in which the professor advertised that there was some fellow up in Alaska who wanted an assistant on a whale research project. I thought, *Wow, going to Alaska and studying humpback whales. What could possibly be more exciting?*

Swent: Was your sister already in Alaska then?

Harrison: Yes, she was. She was in Ketchikan, and I ended up going to Juneau, but it turns out that the fellow who wanted a research assistant wasn't exactly what I would now call, by my present standards, a researcher. He was a high school teacher who would take his classes on his boat every summer to observe the humpback whales in Glacier Bay. His theory was that the tour boats, the noise from the tour boats, was harassing the whales and driving them out of the bay. He had very strong opinions about that, and he tried to convince the Park Service to change its rules and so on. But he didn't have any academic credentials, and they tended not to believe him.

But the project for which he wanted an assistant was something a lot less glamorous. He and the students had collected the skeletons of a mother and calf whale that had beached a couple of years previously. His dream was to make a big exhibit of these at the Juneau Museum and perhaps elsewhere, too. And so what he wanted an assistant for was to clean up smelly whale bones. So I spent a summer mostly in Juneau, cleaning up smelly whale bones. It really wasn't a good experience in a lot of ways.

I had a wonderful time seeing Alaska for the first time. That was great. Did do some traveling while I was there. But as a way to get to know what research was all about, it was a bust.

Swent: Although sometimes research ends up doing some pretty low-level, smelly things, too, doesn't it?

Harrison: Oh, sure. No, it wasn't the smelliness that was the problem. It was the fact that there wasn't really a research program underlying that. It was all just kind of weird. It wasn't a good situation in a lot of ways. This fellow had a real chip on his shoulder. Because he had been sort of snubbed by the Park Service in Glacier Bay, he was really trying to prove to the world that he really was a scientist, and it just wasn't a good scene. Anyway, that was my one attempt to learn about research, and it didn't work too well.

Prior to that, I guess I had a summer job working for a gynecologist in Sonoma once, so I had the experience of just working in a medical office, sort of helping pass instruments to the doctor and things like that.

Swent: That was when you still thought you might go to medical school.

Harrison: That's right. That's right. I had some others, too. I can't remember now what they all were. I was involved in environmental stuff as a college student, too. In fact, in 1981 and '2, it must have been, I was very involved in the Friends of the River. It was the campaign to save the Stanislaus River from being dammed. That was ultimately unsuccessful, too, but I was very immersed in that.

Swent: What did you do for that?

Harrison: Oh, everything: phoning people, passing petitions, writing articles, the whole gamut of environmental activism kinds of things, yes.

Exchange Student in Kenya, 1980-1981

Harrison: Oh, I guess another thing I should probably mention biographically is that I spent the academic year 1980-'81 in Kenya. I was an exchange student. So I took all my first ecology classes at the University of Nairobi and actually had some really good classes there. There was a year-long series in terrestrial ecology and a year-long series in aquatic ecology, and in both of those classes we got to go on some field trips to game parks and things like that, so that was another thing that I suppose left its mark.

Swent: Oh, I'm sure, that would be very exciting. Were there other students from Davis?

Harrison: There were no others from Davis. There were six of us all together from different UC campuses. Oh, I guess there was one other person from Davis, yes. The study program director was Thelma Rowell, a primatologist from UC Berkeley.

Swent: Were they all American students?

Harrison: Yes, they were all Americans. I guess I missed the boat, narrowly missed the boat becoming a paleontologist because Thelma was friends with Richard Leakey, at least acquainted, and while there, I took a paleontology class that she taught at University of Nairobi, and he asked her if any of her students would like to come and help him on a new dig he was doing in Lake Turkana, and I immediately said, "Yes, yes." And nobody else--the other four students in the class were all Kenyans, and she told him of my interest, and he said he was only interested in Kenyan students; he wasn't interested in having any American students. So if it hadn't been for that twist of fate, maybe I would have ended up a paleontologist instead. Very disappointed not to get to go and help dig up human skulls at Lake Turkana.

Swent: I would think that would have been a very exciting year.

Harrison: Yes, yes.

Swent: Was the elephant controversy a big thing?

Harrison: I think at the time elephants were not doing well. Jomo Kenyatta's widow, the ex-president's widow, was apparently running a poaching ring. At least that's what people said. And poaching was intense. Elephants and rhinos were declining.

I'm not sure of all of what's happened since then, but I know it has been up and down over the years.

Swent: You didn't get into that?

Harrison: Not particularly, no, no. I did do some work for a nonprofit environmental group there called the Environment Liaison Centre. Nairobi was the headquarters for the United Nations Environmental Programme, and the Environment Liaison Centre was supposed to be a mechanism for nonprofit organizations, environmental groups all over the world, to have input into UNEP's decision making. But I think UNEP ended up being kind of a disappointment. I think that most of the UN's environmental work ends up being done through other branches of the UN, and so UNEP was kind of a sideshow.

But while I was there, I wrote a report on worldwide, sort of village-based organizations working in the area of water. There's a lot of concern over water quality in very poor countries. It's not a luxury issue; it's a life-and-death issue. Even in India, Africa, other places there are village-based groups for protecting watersheds, protecting springs and water sources. I wrote a report and directory of these organizations as a spare-time project while I was there.

Swent: I was just briefly in Kenya two years ago, and at that time the water was--what I learned of water was through its being a women's issue. Did you get into women's issues at all?

Harrison: Yes, that was definitely the case. In this directory that I wrote, I think most of the--or many of the--water-related organizations were also women-based organizations.

Swent: The men tended to want to use the water for the cows.

Harrison: Yes, and it was the women who were responsible for making sure the kids grow up healthy and have water. One thing I remember learning is that some of these well-intentioned programs will build piped water supplies to villages so that the women won't have to walk for miles to a well. But it turns out that in some societies the only place the women ever get the chance to socialize outside the home is when they're all at the well together, and so when you pipe water into people's homes, you're sort of breaking up the system for women to communicate and exchange information and so on.

Learning about those sort of aspects of the environment was certainly a new experience for me. But I can't say I was directly involved in any groups like this. I think as an outsider it's hard to directly participate. And women did not have an easy time in Kenya. I'm sure it's still the case.

I remember there was a bill to ban wife beating during that time I was there, and it was completely voted down in Parliament, almost laughed down. One of the Leakey brothers was one of the only two members of Parliament who voted in favor of it. It was terrible.

Swent: And this was?

Harrison: Nineteen eighty and '81. I'm not sure how much things have improved since then. Maybe they have.

Swent: You were an undergraduate.

Harrison: Yes, that was my third year at college, that's right.

Swent: Junior year abroad.

Harrison: That's right. That's right.

Swent: That was exciting.

Harrison: Yes, yes, it was.

Swent: And at that point you were still thinking of medical school.

Harrison: Yes, that's right.

Graduate Study in Ecology: Caterpillars and Patches

Swent: So then after your year as a research assistant, and then you signed up to do graduate work, and you did your master's at Davis in zoology.

Harrison: The ecology program.

Swent: Your undergraduate major was zoology.

Harrison: That's right.

Swent: And then this graduate program was?

Harrison: I was in the ecology graduate group. My master's research was on these caterpillars and their host plants and their parasitoids at Bodega. That was my main project.

Swent: You began publishing very early. I think your first publication was when you were still an undergraduate, wasn't it?

Harrison: It was when I was a master's student. Maybe even the first year I was a master's student, one little thing came out. I got involved in some side projects while I was a master's student, too, which was a lot of the fun of it.

One of them was--another professor who has really been a big mentor over the years is Jim Quinn at Davis. He and my master's advisor, Rick Karban, had a project looking at habitat fragmentation in sort of a microcosm. They had a pasture with sheep grazing the grass down very closely, and then little exclosures of different sizes. The idea was to ask, Do you get more species if you have many small reserves or a few large reserves; only the reserves in this experiment were little square exclosures. We would sample plants and insects and things inside the exclosures.

The question was, Would a collection of very small patches or a collection of a smaller number of larger patches end up having more species? So I think my name was on a paper about that project in about '85, or something. I think that might be the first paper on my c.v.

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Swent: So that's when you began working on patches.

Harrison: Yes, that's when I got interested in all these spatial issues that I'm still, really, in a lot of ways working on: questions about habitat size and habitat isolation and movement of organisms between patches of habitat. It's a very popular subject in conservation biology, which I guess you can say is a sub-field of ecology, a sub-field of biology--because of the idea that there are so many habitats now that are either naturally patchy, like serpentine outcrops, or getting more patchy, more fragmented than they used to be, like forests.

So we now have many habitats that only exist in remnant patches. It raises a lot of questions about how does an ecosystem function? How does the function of an ecosystem change when it's confined to small isolated patches? Do you still have all the same processes occurring, or do you get shifts in, say, the ratio of predators to prey or any number of other things you can imagine that can change when habitats get isolated.

Total diversity could change. Some species could be lost from a system because they can't survive in small isolated patches, and other species could get more common because if they flourish in the matrix outside the patches, they could spill over into the patches and change the balance there, too. So all of those things can happen in both naturally and unnaturally patchy habitats.

Certainly because of Jim's influence and because of that early project, I guess I became interested in that.

Swent: You got your master's then in?

Harrison: In '86, I guess, spring of '86.

Swent: Did you do a particular dissertation or thesis for that?

Harrison: Yes. The main part of my thesis was the work on the caterpillars on lupine bushes, tussock moths and woolly bears eating lupine bushes. What I ended up showing--the main part of my master's thesis was a paper showing that when woolly bear caterpillars feed on lupine bushes early in the season, it changes the food quality of the bushes so that tussock moths, which feed on the same bushes later in a season, don't do as well. So they're competing with each other, even though they're separated in time.

I had a side project about the habitat fragmentation and a side project on serpentine butterflies, which I started as part of my interaction with Art Shapiro.

Swent: Were you doing teaching as well?

Harrison: No, no, not then. I guess the first teaching I ever did was at Stanford, when I was a doctoral student. I T.A.'ed an introductory biology class a couple of times.

Swent: But you were not a T.A. at Davis?

Harrison: No, no. I had fellowships.

Student Advisor to the Natural Reserve System

Swent: What about administration? Were you on committees?

Harrison: Yes. At some point I have to tell you this whole story of how the reserve involvement began, but it was--at least in 1985 and '86, the academic year '85 to '86 I was the student member of the Campus Advisory Committee to the Natural Reserve System. I sort of think I might have also been on that committee the previous year, '84-'85, but I'm not sure. I don't have any written record of it. But that was how I first got to know about the Natural Reserve System.

Swent: I someplace have the figure on when that Natural Reserve System began, but it was very new then, wasn't it?

Harrison: It was fairly new. It began in the seventies and has been sort of growing ever since then. I think Davis may have gotten its first reserves in about the early eighties.

Swent: I guess so. The McLaughlin one was first approved by the Regents in '92. But the system, itself--well, it doesn't matter.

Harrison: It dates back to the seventies, but mainly at other campuses. It was a person at UC Santa Cruz, Ken Norris, and one of the southern campuses, Mildred Matthias--who were sort of the founding father and mother of the system. It was a system that sort of grew up from the grass roots. Nobody up top ever decided that the UC needed a system of reserves; it was just individual environmental faculty who noticed that it was getting harder and harder to find places to do field work, secure places where you could have access and know that the access wouldn't be taken away and also that the land wouldn't get developed. It was getting harder and harder just to find places to go do field experiments.

And then during the seventies there were some big donations of land to the university, and so the idea of creating this reserve system grew up. Davis eventually ended up, over time, with six reserves, but Davis was never a real strong campus in terms of how well organized things were. These reserves came along. They happened. And there certainly were individuals who got very involved in developing them and cared a lot about them and did a lot to take care of them. But there was never a strong core of administrative support, and the system sort of languished for a while.

But let me go back and tell you what I can reconstruct about the whole McLaughlin thing got going, at least from my limited perspective.

Swent: I had one more question, about this sheep pasture, for instance. That was a private arrangement with a sheep farmer, was it?

Harrison: It was actually on some university land. I forget. I think they got to do the grazing--there's sort of an agricultural service on campus so that if you want to do an agricultural experiment, they'll come and plow your fields for you or something like that, so I think this was all just done through campus mechanisms, and it was just on some land west of the main part of campus, which was set aside for agricultural experiments, so it wasn't on a reserve.

Swent: Okay. Well, let's talk about the reserves.

Harrison: As far as I can tell--and it would be really interesting to hear what others remember about this--it all started in about 1984 and '85. Bob Matthews is now emeritus lecturer in our geology department. In 1984 he was a member of the State Mining Board, and he was also lecturing at Davis, and he would take his classes out to watch the mine being built. And so he got to know Ray [Krauss], and they started chatting about how it would be nice if the site could be available for teaching and research.

I have no idea whether that led to Ray's idea of creating the reserve, or whether he thought of that independently. At any rate, I know that by '85 it stated in some of the permit applications to the counties and some of Homestake's p.r. [public relations] material that the land would become an environmental field--a university environmental field station after the mine was finished. But those were early days, and the UCNRS [University of California Natural Reserve System] hadn't yet been brought into the picture. There was obviously no certainty that UCNRS would agree to such a deal.

I notice in those early documents that it says that this future environmental field station would be managed perhaps by a consortium of universities and local colleges, or something like that. But looking back at some of my memos and things, I can see that as early as about 1985, Ray approached the Davis branch of the NRS to ascertain whether people would be interested in a deal that would create an NRS reserve there.

In October 1984, as early as that, people on campus were thinking--perhaps independently of the whole Homestake deal--were thinking: Gee, maybe we should have a serpentine reserve. NRS doesn't yet have a site that represents this very important habitat in California, with all the interesting endemic plant species and so on of serpentine.

So various people, including me, including Phil Ward, now my husband, and several others formed a Serpentine Reserve Subcommittee of the campus NRS Advisory Committee. I found this--

Serpentine Reserve Subcommittee Investigates Morgan Valley, 1986

Swent: You were already on the Advisory Committee.

Harrison: Well, that part I'm not sure about. I was part of this subcommittee, but I'm not sure that I was a member of the Advisory Committee, itself, until June of 1985. But in 1984-85, people were beginning to think about: Gee, maybe we should have a serpentine reserve. Of course, this was at the same time that Bob Matthews was getting to know Ray, and lead field trips out at the site and so on.

In February of 1985 I attended and took notes at a presentation by Ray to the NRS Advisory Committee, in which he talked about the mine and how environmentally sound it was, and just laid out to us the possibility of having a reserve there.

And in June of 1985 I was on a field trip with the Advisory Committee, with some other people, including Ledyard Stebbins and Bob Matthews and Ron Cole from our wildlife department, and Phil Ward. Ray showed us around the site and told us about it. There was some internal discussion over this proposal. One question that was raised is: Do we really need to have a reserve there? People can go and do research there if they want. Maybe all we need is a memorandum of understanding with Homestake. We don't need to go to all the trouble of having a reserve and then, let's see, if we do have a reserve, will enough people use it to make it worthwhile? And then, conversely, if there is a need and enough interest in having a serpentine reserve, should it be there, or should we look at other sites? Perhaps we could do better if we looked at other places.

And so our self-proclaimed Serpentine Reserve Subcommittee took some field trips. In summer of 1985 I wrote a proposal to the Mead Minigrant Program, which was the NRS's sort of in-house student grant--what's the word I'm trying to think of? Anyway, the NRS has grants for graduate student research, and I wrote a proposal to them to investigate sites for a prospective serpentine NRS reserve. And in November of '85 this group of us, our serpentine subcommittee, put out a letter to the Davis faculty, asking people to respond with their interest, if any, in doing research on a serpentine reserve, whether they thought it was a good idea, et cetera.

Apparently, the response was rather low. We got four enthusiastic letters back, but that was all, and so I notice from the minutes of the February 1986 meeting of the Advisory Committee that because of this low response, people felt that maybe just a memorandum of understanding, not a natural reserve, was a better idea. But nonetheless, in spring of '86 we proceeded with this little series of field trips. We looked at six sites.

Swent: What were they?

Harrison: There were two sites at Homestake, Morgan Valley and another place, and Frenzel Creek, which is part of the Mendocino National Forest, and the Cedars in western Sonoma County, and a place near Davis called Cappell Creek, and another place called Butts Canyon. So there was a group of about three to six of us that would go on each of these trips. I would collect butterflies, and Phil would collect ants, and several people would make notes on which--they didn't try to make a plant list, but they would make notes on which types of plant communities existed there.

We were looking for a site that had a good diversity of everything. I was particularly interested in nine species of butterfly that have an association with serpentine. They feed on plants that are restricted to serpentine, and so these are serpentine-endemic butterflies. My premise was that these would be good indicators of a good site. If you had all those species there, then you would have a diverse site.

Well, it turned out--

Swent: I was going to say, did you have reason to think that these other sites would be available to you?

Harrison: No, no. We were just sort of acting off our own bat. [laughs] There was certainly no guarantee that anybody would pursue and try to get money to actually buy land for the NRS or anything like that. But from a scientific point of view, it seemed like a good idea to make sure that the Homestake site stacked up well, compared to other sites in the region, before rushing into accepting it.

As it turned out, this site that we called Morgan Valley was the best of all the sites we looked at. It was the only one that had full range of habitats, all nine of the butterfly species, just generally really high diversity of the flora and fauna. That's the site where Morgan Valley Road crosses the Napa-Lake County line. It's the place that we now call Research Hill. This particular site just seems to be a magnet. People come out there and look at it and get really interested because it's just a very, very diverse spot.

There's a serpentine wetland there, there's a hill that has a whole series of springs that feed little streams that come down, there are a lot of rare plants that are concentrated in this one place, and it's just a very attractive spot, too. And there's a big grassland across the road, the southern end of--I guess it should actually be called Hunting Valley, not Morgan Valley. At the time, they called it Morgan Valley, which has a very nice native-dominated grassland. That site is still, I think, sort of the heart of the reserve. It's where we take all our field trips and show the place off to people.

We sort of fell in love with it back then in 1986, and I notice from my field notes that I went there four times and to another site in that area, Dunnigan Hill, twice, and once to a place that I called Quarry Road Hill, which--I can't even figure out now where that was.

Again, just digging through my files, I noticed that in June of '86 I wrote a letter to Ray saying, "Thank you for letting us come visit the site, and boy, we really liked this one place, where the county line and Morgan Valley Road intersect, and maybe you could give some attention to protecting it from off-road vehicles because it's getting damaged by off-road vehicles."

And I also see in the files--I began digging through the university files when I became the NRS director, and I found a copy of a letter from Ray to the Bureau of Land Management, relaying to them that we were interested in that site and perhaps Homestake and BLM could pursue making it into a park or something like that. I think that's as far as that ever went.

Swent: And that was when?

Harrison: That was in July of 1986. Some things never change! [laughter]

Swent: But they are still in talks for that Blue Ridge area as a reserve.

Harrison: That's right, yes. One of the challenging aspects, now that I'm a reserve director, getting the reserve off the ground, is the whole interaction between what goes on on the Homestake land and what goes on on the BLM land. They interdigitate very closely, especially at that spot. It's a place where everything that we do on Homestake land comes into close contact with all the crazy stuff that people are doing on the Knoxville BLM land, the shooting and driving off the roads and things like that.

Actually, one of my happiest accomplishments in the couple of years since I've been the reserve director has been--well, I can't claim the entire credit for this myself, but I worked with the new people at the Ukiah BLM office, who are a good bunch, and personally helped work with them on the idea of putting barriers up all around that hill, and there are now barriers at about six or eight different access points that have pretty well sealed off that hill so that people can't trespass there any more.

What used to happen is people would take a shortcut from Morgan Valley Road to the BLM road by driving through this beautiful serpentine wetland, and I think they thought they were on BLM land because it's not signed or fenced or anything, but they were actually driving through Homestake land and trashing a little wetland, just as a shortcut. Plus people love to drive in mud. That's one of the things that always happens there. People like to roar around in someplace muddy, and so for years that had been happening there. And it has only been a year and a half now that BLM put up these barriers. And we also--the Natural Reserve System built a fence as part of this effort. For the past year and a half the place has finally not been driven on for the first time in fifteen years.

Swent: Is it recovering?

Harrison: Yes, I think it's beginning to, yes. I think wet areas tend to recover reasonably fast. There are still tire tracks and broken glass, but it's not as bad as it used to be.

The Natural Reserve System Organization

Swent: Well, I guess we should go back. So you were on the natural reserve advisory committee.

Harrison: Yes.

Swent: Whom were you advising?

Harrison: Well, at the time the NRS was managed by an administrator in our Office of Research, a woman named Jonellen Goddard. She was the director in the sense that she had control over the budget and the personnel, such as it was; it was just a staff of one. We, as an advisory committee, were supposed to discuss matters on each of the reserves and make recommendations to her about what should be done.

Swent: And was there a reserve near Davis at that time?

Harrison: Yes. We had four at the time: Stebbins Cold Canyon, and Jepson Prairie--we should actually check because things have changed, and I'm not sure which ones were reserves back then. But I saw it in one of these memos here [looks through papers]. Here we are. Stebbins Cold Canyon, Jepson Prairie, Bodega, and Putah Creek.

Swent: I'm not quite sure what a student advisory committee might do.

Harrison: It was a faculty advisory, or administrative advisory committee, composed mostly of faculty, but typically these committees have one staff representative and one graduate student representative, and we still have that since I've become director. We still have the campuswide advisory committee, and we have separate advisory committees for most of the individual reserves, so that the people who are most excited about each reserve can have some input into decision making.

We have very limited funds and very limited staff time, and so having a committee like this really helps people stay involve and engaged and also helps prioritize bringing up issues and deciding how important they are relative to other ones, and we figure out how to direct our efforts. Virtually all academic programs have an advisory committee of some sort, and sometimes it's just a rubber stamp and other times there's more involvement. I think because the Natural Reserve System is cash poor, we're committee rich. What you can't do with money you can do with volunteer effort, and one thing the committee served to do is get people involved as volunteers and spend a little bit of their spare time helping to do stuff.

So each of the reserves has typically had a faculty committee chair who is sort of like the faculty reserve manager. They keep tabs on what's going on in the reserve, they make recommendations about what it needs, and we still do that. Those efforts have come and gone over the years because people get excited about something for a while and then they lose interest.

We used to have several people who were really, really personally attached to some of the reserves, and so they would make sure that things didn't fall apart too badly there, but then a few years ago, that interest kind of slacked off and the NRS went through a down period in the, I guess, late nineties. And then I got drawn into being a faculty coordinator and then the faculty director in 1998. I guess we're skipping ahead of the story. If you want to go chronologically, that is. I don't know what system you want to use.

Swent: We have to go back and forth, but I'm just wondering precisely what sort of things--did you go out and visit each reserve and make sure that it's not being damaged?

Harrison: Not as a committee. At the time, there was one reserve steward for four reserves. Now we have a reserve manager, a reserve steward, and a temporary sort of assistant reserve steward for four reserves. That group of people manages McLaughlin, Quail Ridge, Jepson Prairie, and Stebbins Cold Canyon. We have two other reserves, Bodega Marine Reserve and Eagle Lake Field Station, but they each have their own managers, so they pretty well run themselves.

But anyway, it's the paid staff, the reserve managers and reserve stewards, who are responsible for going out there and seeing how things are and reporting back and so on. But the advisory committee fills in the academic part of that: what do people need, what are people interested in, what could we do to get more people using the reserve, are there problems or conflicts between different users of the reserve, and if so, how should those conflicts be mediated.

The staff can't always mediate disputes or unresolved issues between faculty. That would put them in a difficult position, so part of what you can do with an administrative advisory committee like this is to get faculty to sort out their own issues and, if necessary--now that I'm acting as a faculty director, I can also step in and try to mediate some of those things. But getting people's input about where to go with the system and keeping them involved so that they'll contribute to the system are functions of this committee.

Swent: What sorts of issues come up between faculty members?

Harrison: Things like conflicts over projects. This doesn't happen very much at our reserves, partly because our reserves haven't been all that well used. Bodega would be the exception to that. Bodega is very heavily used, and it's a small reserve, so there are times when it's difficult to accommodate everybody that wants to use the place. There may be physical overlap between people's projects. Problems haven't really been very bad or contentious.

But if you have a reserve manager who's there on site all the time, they can make adjustments and ask people, "Could you please move that experiment over here so that it won't interfere with what that person is doing there?" Reserves that don't have managers--it's more difficult to make those kinds of decisions. What we really need to make the system function well are more paid staff, but that's a pretty old story, I guess.

Swent: Everywhere.

Harrison: And in the long term, too, to make the system function well, you need really active input. You need faculty who are interested in writing grants for research at the reserves, who are interested in talking up the reserves to their colleagues, interested in leading classes there, putting in an active effort to raise the whole profile of the system, because the hard thing, of course, is convincing our administration that it's worth putting money into this.

Unfortunately, compared to fifteen years ago, the environmental sciences--at least the field sciences--have somewhat fallen out of favor. They used to be more fashionable than they are now. Now everyone talks about genomics, the gene sequencing and things like that. Natural reserves are sometimes considered kind of quaint and anachronistic; it's just for the bugs-and-bunnies crowd, as they sometimes say. And so it's really important to keep people involved and to keep reminding our administrators that actually reserves are still really important and an increasingly important part of cutting-edge science, the kind of thing that administrators like to hear.

So since 1998 I've been pretty involved in both cheerleading for the reserves and trying to get my colleagues interested in helping cheerlead for the reserves.

Swent: We did jump way ahead. Let's go back. You were at Davis and got your degree--did your paper on the woolly bear caterpillars and--

Harrison: Tiger moth would be the more upscale name for it.

Ph.D. from Stanford: Butterfly Metapopulations

Swent: And then you went directly from there to Stanford?

Harrison: Yes. Between the two, I did a little summer project in Panama, on another moth-plant interaction, and then I went to Stanford.

Swent: How did you happen to do that?

Harrison: The Smithsonian [Institution] has a field station in Panama, and they used to have quite a generous graduate fellowship program. The fellowships were pretty easy to get, and I was toying with the thought of becoming a tropical biologist or at least doing a tropical Ph.D. project, and so I applied for one of these fellowships and just spent a couple of months there, and studied a moth that defoliates an understory shrub in the rain forest in Panama, which was great fun. But by then I had already decided to go to Stanford and work on these checkerspot butterflies for a Ph.D. project.

Swent: What made you decide that?

Harrison: Oh, probably Paul Ehrlich's charisma. That helped. I checked out about four different places for grad school, and when I went to Stanford they showed me a map of these serpentine outcrops in the Morgan Hill-Gilroy area, on some of which there were populations of the Bay checkerspot butterfly, the butterfly that Ehrlich and his students had been studying for a long time. They said this region was one where nobody had really done much research yet, but it looked like an ideal place for studying how this species survives in a patchy, fragmented habitat, because you have small, scattered serpentine outcrops all across the landscape, and some of them support butterfly populations and others don't.

There's even a little bit of historical information about populations that had existed and then gone extinct. So they sort of rolled out the maps and showed this to me, and I thought, *Wow, this looks like the thesis project for me.* I got really excited about it, and so that was what I did.

I went around and surveyed all these sites, about sixty of them altogether, and tried to figure out which outcrops had suitable habitat for the butterfly and which ones had populations of the butterfly and then, besides suitable habitat, what are the other reasons why populations are present or absent. The story turned out to be very blessedly clear and simple, which is that there was one big mother lode butterfly population on a very large habitat, and all the rest of the outcrops only supported butterflies if they had suitable habitat and they were close to the big mother lode population.

In fact, it turned out they had to be within 4.5 kilometers of the big population. This was a pretty good indirect evidence that the small populations of the butterfly blink in and out over time. They colonize a site, there's a population there for a while, the population might go extinct in a drought, and then--the evidence for that is that the proximity to the big population allows new populations to get colonized. If they're farther away than that, then a site could be suitable but it won't get colonized because the butterflies don't disperse very far.

I did some experiments, releasing butterflies out of their habitat to see how good they were at navigating their way to a suitable site, and things like that. It was a really fun project, and it turned out much cleaner and simpler than it might have, which was lucky. And it also turned out to coincide with a lot of interest in this idea of populations in patchy habitats. There's a whole set of mathematical theory that people developed for such situations, known as metapopulation theory. Metapopulation means a population of populations.

My study turned into one of the first early good examples of a metapopulation, and the subject was getting very trendy in the late eighties just as my work was beginning to come out, and so I was very fortunate that I finished the Ph.D. thesis at just the right time to benefit from people's interest in that subject.

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Swent: So metapopulations were the trendy thing at the moment.

Harrison: They were. They were, and it became my professional label. I think it helps when you're new and trying to establish yourself in a career that people associate you with one particular idea, especially if it's a popular idea, and so for a while I was "the metapopulation person," and that helped as far as getting jobs and recognition and things like that.

Swent: I want to be sure that we've got Morgan Hill and Morgan Valley not confused here.

Harrison: That's right.

Swent: We've been talking about Morgan Valley, but this was Morgan Hill, which is down nearer Stanford.

Harrison: Yes, south of San Jose.

Swent: There was a very famous butterfly study down there, the Bay checkerspot butterfly.

Harrison: That's right.

Swent: When did you actually finish your doctorate?

Harrison: Let's see. I finished in '89, I guess. Yes, '89.

Swent: Did you work with anyone besides Paul Ehrlich?

Harrison: There was a professor at University of Washington named Peter Kareiva, who was an important mentor. I had gone to University of Washington to interview with him, and he tried to recruit me to come to University of Washington, but I got lured to Stanford instead, but he was kind enough to still correspond with me, and I did find at times--because Paul Ehrlich is such a busy and famous guy that it was hard to get ongoing advice--also he's not a real quantitative person; he's a more kind of classical biologist from a less quantitative era, and so I couldn't always get the advice I needed from him, and really two people gave me a lot of advice on my Ph.D. project: Jim Quinn, back at UC Davis, and Peter Kareiva, who would send me wonderful, detailed comments on my proposals and papers and things, even though I had decided not to go to grad school there. I'm very grateful to both of those people.

Swent: That is unusual, I think, isn't it?

Harrison: Yes. Peter Kareiva was unusual that way. He took a lot of care with his own grad students, too, to mentor them and to give them job skills, not just research skills, to coach them on how to do well in interviews and things like that, so he was tremendously successful placing a lot of his students in academic jobs, which is pretty unusual. Typically, advisors are not that attentive. He really made his mark, both by doing some really nice work himself and also by being a good advisor.

Swent: And to advise a student at another institution is extremely generous, it seems to me.

Harrison: Yes, that's right.

Swent: Anything else about your Stanford experience that ties in with what later happened?

Harrison: There probably was, but I can't remember.

Swent: Where were you living at the time?

Harrison: I lived in Palo Alto for a couple of years, and then my last year there I was living in Davis.

Post-doctoral Research in England and a Transatlantic Courtship

Swent: You were not married yet.

Harrison: No, no. In fact, the personal side of the story here--Phil and I started going out in the summer of 1983, just after I finished my undergraduate--before I was a master's student. But at the time I thought I was going to leave at the end of the summer to go to medical school, and I wasn't really taking the whole thing quite as seriously as I should have, and it didn't quite get off the ground that first time.

And then we were both involved in other relationships for about the next three years, and then just after I left for Stanford in the fall of 1986--I think about the middle of that winter, a friend of mine back in Davis wrote me a letter and told me that Phil and his girl friend had broken up, and apparently a friend of Phil--well, actually, my old advisor, Rick Karban, I guess passed along to Phil the fact that I had once told Rick that I regretted not making a better go of it the first time, and so both Phil and I tried to get in touch with each other.

There was some funny story. I don't know if it's worth recounting.

Swent: Sure.

Harrison: But I tried to call him in Davis to invite him to come to Stanford and go hiking in the hills somewhere, which I figured would appeal to him, but he was away in Europe, and the person staying in his house at the time was another person who I had gone out with during that summer of 1983, who I guess was still kind of interested or something, too, because he never passed along this message to Phil. But Phil got back from his trip, and independently he heard from Rick, got from Rick the idea that he should get back in touch with me.

And so he called, and I thought he was returning my call. It turned out he wasn't. But at any rate, he came to Stanford to go hiking. That was in March 1987, and so we've been together ever since. It's not often you get a second chance like that.

Swent: It's good that you--

Harrison: The timing just happened to work out, but we didn't get married until '91.

Swent: Was that part of your decision to go back to Davis then?

Harrison: Well, we were really lucky in that it's often hard for two people to get jobs at the same place, but when I finished at Stanford, I was sort of rushing to get through; I really wanted to finish my Ph.D., and I didn't really think about what was going to come next, and so when I finished, I didn't have any jobs lined up. The one thing that was available that seemed really interesting was a post-doc in England.

There was a new Centre for Population Biology that had just been started there. This was actually part of Margaret Thatcher's plan to reorganize British academia. She was going to put all the research funding in a few centers and cut off research funding to everyplace else. And so these new centers were created that made a lot of controversy. And to make things even more controversial, John Lawton, the fellow that started the Centre for Population Biology, hired his first crew of post-docs, and seven out of eight of us were Americans. This ruffled some British feathers.

But at any rate, I was one of this initial crew of eight post-docs at a new center, and that was very exciting because everything was sort of new and unsettled, and people hadn't established any roles or hierarchies yet, and I had a great time there for a year and a half.

Swent: Where was this?

Harrison: At a place called Silwood Park, near Ascot, southwest of London. Part of Imperial College. It began as a field station of Imperial College.

Swent: And you were there for a year and a half?

Harrison: Yes. So Phil came over about four or five times. We would go on holidays to various parts of Europe. I came back once, which was to interview for the job at Davis. Actually, I came on a trip and interviewed for five jobs at once. It was about three months after I'd begun the job in England. Of the jobs that I interviewed for, I was offered the one at Davis and one at Arizona State.

The one at Davis came about through sort of a fortuitous means. UC has a program called Targets of Opportunity. It was established by the legislature so that there would be more role models for women and minority students. And the idea is there's a separate pool of money for creating positions, and a department can apply to get a new position for a specific person who fulfills one of their departmental needs and who is also either a woman, minority, or handicapped.

So my old friend Jim Quinn at Davis, about the time I left for England, started turning the wheels to try to get a Target of Opportunity appointment for me. So then I came back and interviewed for that, and it ended up going through. It was really lucky because the program was brand new at the time, and a few months later is ceased to be effective. It still exists, but what happens now is that if a department gets one of these positions, then they lose some future position they could have gotten, and so nobody really uses this program any more.

But luckily I sneaked in through this window of opportunity, so to speak, and that was how I ended up with the job at Davis. If it hadn't been for that, Phil and I would have been in the same position as, well, practically everyone else we know these days. You know, everyone meets their mate at graduate school and then they're on the job market together, and it's a really lucky day when two people get jobs they like at the same place. We know so many people that have tried for years, and in one way or another it often doesn't work out for years and years.

Swent: When were you in Costa Rica?

Harrison: I was there in 1986, when I was a master's student at Davis. I went there for the first time on a program called OTS, the Organization for Tropical Studies, which has for years and years trained most of the American tropical biologists. They have a wonderful program, a graduate field course, that lasts for about six weeks, and you go to all different parts of the country, and you study all different aspects of tropical biology, and there's a whole parade of guest instructors who are tropical biologists, mostly people who work in Costa Rica. And so it's a wonderful immersion in all kinds of different tropical ecology. I was there then, and I've been back a few times since.

Another thing I did at Stanford: When I was just about to finish my Ph.D., Paul Ehrlich, in his wisdom, said, "Well, you really should do something besides just your main project. You should have something else on your c.v." And so at his suggestion I undertook a modest project to determine whether population growth or economic inequality were more responsible for tropical deforestation. A nice "simple" little question.

What I did is I spent a month in Costa Rica collecting data from all kinds of government agencies and various sources, including maps of forest cover, census data, agricultural census data, and all of this from the time period of about 1950 to 1983, and assembled this all into a database, and then tried to ask, What correlates most strongly with deforestation? Increase in population or change in land tenure patterns, change in farm sizes, all this sort of thing.

About the only clear-cut answer that I got was that deforestation is extremely strongly correlated with increase in the number of cows. [laughs] So it seemed to confirm the conventional wisdom that a lot of times deforestation is propelled by small farmers who clear the land, not so much for timber but because cattle grazing is a simple means of being a subsistence farmer in a tropical country. And so people would clear the trees, burn them, and then graze cows there. Oftentimes they wouldn't succeed. And then later on the land gets bought up by a large farmer and gets turned into sugar cane or cacao or something else.

My attempts to demonstrate a direct link between that and population growth were completely unsuccessful. There are so many twists and turns to the relationship between numbers of people and acres of land that you can't really get a--I could never get a clear answer about whether the ultimate cause of this whole process has to do with population growth or with all the other things that affect how people do what they do.

Swent: It's being pushed, though, I think--I'm obviously just on the fringes of this, but I remember hearing a lot of talk about how they were trying to get rid of so many cows in Costa Rica, that this became a big issue for a while.

Harrison: Yes, yes. But you can look at it one of two ways. I mean, are the cows--or is it the beef industry that's really the cause of the problem, or is that just one of the ways that people use to make a living when they don't have any other choices? And if it's the latter, then attacking cows or attacking the raising of cattle by itself doesn't make any sense. It's what do you do to provide for people's need to go and farm someplace?

People chose cattle--my sense is it's not so much because of Burger King wanting cheap meat for their fast-food chain; it's more the fact that cows are a very low-tech form of agriculture, so if you're out in a remote area, it's very hard to have plows and fertilizer and bring your crops to market and things like that, but cows will walk through the jungle to your clearing, and then you can raise them, and then you can walk them back out to market.

Swent: And you have milk as well.

Harrison: That's right. That's right. So it's one of the easier ways for people--not that it's easy, but it's one of the more accessible ways for people to make a living when they're subsistence farmers. I think the real point is to somehow stabilize the farming system there so that good land is used intensively and then some land is set aside for watershed preservation and national parks and things like that. People always like to latch onto some big corporation as the enemy and say, "Gee, tropical deforestation is all the fault of McDonald's and Burger King," but I think that's kind of spurious. That's sort of looking for an easy target but not really coming to grips with how complex the problem is and how much of it just goes back to, gee, there's a lot of people in the world and they all need to make a living.

Swent: And eat.

Harrison: And eat, yes.

Swent: So that was your secondary project.

Harrison: Yes, that was my "little side project" then.

Swent: What research were you doing at Silwood Park?

Harrison: I did another sort of metapopulation study. A couple of my fellow post-docs and I--we looked at a plant, a weed called ragwort. It has some insects that feed on it, in fact, that have been introduced as biological control agents, and we were looking at how these insects interact with each other in a patchy environment consisting of patches of ragwort scattered around the farm fields. It was taking the same idea of metapopulations but looking at a community instead of a single species: in this case, the community of about six or eight insects that were specialized to feed on ragwort.

I had some side projects there, too. One of my fellow post-docs, who was one of the experts on British butterflies--we had a side project looking at some butterfly populations up in north Wales that he had studied as a master's student. That was a lot of fun.

Swent: You never get away from butterflies, do you?

Harrison: Well, I have now. I've pretty much given up butterflies now, yes. That side project in England was about the last time I've done anything with butterflies.

Teaching Ecology and Conservation Biology at Davis

Swent: And then you interviewed at Davis and got the job.

Harrison: They let me delay a year before I started so that I could--I had just started the post-doc in England, and I didn't want to leave without doing something, so I stayed there for a year, and then I started at Davis as a faculty member in the fall of 1991.

Swent: Then you were teaching.

Harrison: Yes, so then I was teaching for the first time. And that was a challenge. It still is. My classes are an undergraduate, upper division general ecology class, and a graduate conservation biology class, and then some sort of a seminar, a special-topic seminar once a year. Those are the three things that I'm supposed to do each year.

Yes, undergraduate teaching, I would say, is the aspect of my job that I still feel least contented with and still feel the need to keep working on. Part of it is that the class I've been teaching is a pretty large one. It has been anywhere from

75 to 150 people, and I think it would be a very different experience to teach a small class, where you really got to have some interaction and feedback with the students.

In a large class like that, I find that the only people you end up having any kind of dialogue with are about the five people who always sit in the front row and who seem really interested, and the other 145 people are the ones who sit back there, staring blankly, and you never really know whether you're getting across or not, so that's kind of frustrating.

It's a very mixed class. People come in with all different levels of interest and background knowledge, and it's easy to slip into just talking to the most advanced ones. And I think there's some difficulty, too, in finding a message that I'm really comfortable with, in the sense that a lot of what passes for the basic material in ecology seems kind of trivial to me, and there are times when I'm tempted to teach more of a problem-focused class, like environmental issues.

One always goes back and forth between teaching the things you're most interested in and really feeling like you need to cover the basics, even though you don't really believe in them and you're not that excited about them, but they're somehow part of the fundamentals of the field. I haven't quite hit what I consider the perfect mixture of subjects.

Swent: Is it a year-long course?

Harrison: No, no, it's just one quarter, so you have to do all that in ten weeks.

Swent: Oh, my.

Harrison: And it's such a big subject.

Swent: Yes. Freshmen? Sophomores?

Harrison: Juniors and seniors mostly.

Swent: So some maturity.

Harrison: Yes. I don't know, though. I get the sense--this may be just an old professor thing to say, but I get the sense that more and more students are just sort of there to get through. The attitude is more one of just sort of trying to survive and get by and get a good grade and get onto the next thing. I think even in the ten years I've been there, I've seen kind of a sense of less--I don't know--genuine interest in learning. It just seems that somehow everybody's under more pressure and less motivated by ideals and more motivated by just getting the job done or something.

Swent: Can they take this class pass-fail?

Harrison: They can, but most people I think need to take it for a grade. They're certainly very grade-conscious. They always want there to be simple answers. At the end of the lecture, there needs to be sort of a gray-shaded box with: These are the three take-home messages or something. And in ecology so many of the important questions are either unanswered or the answers are very complex.

My standing line in that class is that the answer to all important questions in ecology is: It depends. And what you need to do is learn to ask the next question, which is: What does it depend on? Not everybody is like this, but I think the average student isn't happy with really having to deal with all that uncertainty and thinking for themselves. They would like to have some simple take-home message at the end of the lecture.

So it's hard to strike a balance between giving people some simple messages that they can feel good about, and some concrete information that is interesting and useful, and then also introducing them to these complex ideas that don't have answers. Some people love that, and others don't.

Swent: Well, the five in the front row presumably make up for the others.

Harrison: That's right. That's right, yes. That's always fun.

Teaching the graduate class is always really fun. The graduate students are 100 percent motivated. They're all there because they really want to learn about conservation biology, and I never have any sense that anyone is just there to fill in time.

Swent: And, of course, you get the chance to be closer to them.

Harrison: Yes, that's right. That's a class of maybe twenty or twenty-five people, so I get to know them all by name, and we talk about their research projects, and it's just a much different kind of experience.

Swent: Do you have T.A.s [teaching assistants] to help you in the other class?

Harrison: Yes, yes, there are T.A.s that lead discussion sections, and they really do a lot of the work. They do a lot of the actual one-on-one communication with the students. So I think some day I'd like to drop teaching that class and try teaching a small class, a twenty-five- or thirty-student class with no T.A., so I could see what it's like to teach a more intimate undergrad class.

Swent: How much choice do you have in what you teach?

Harrison: We have a fair amount of choice. Those kinds of things are decided communally by the faculty. If someone really doesn't want to teach a course, they can try to find someone else to teach it and propose something else they would like to teach. It all has to be negotiated, but people like to--the general attitude is that everyone needs to be happy with what they're doing to do a good job of it, so we try to accommodate--

Swent: Some courses have to be taught.

Harrison: Yes, that's right. That's right. And actually, for the last couple of years I haven't been teaching my undergrad class because I've gotten administrative release time to work on the Natural Reserve System, which means the Office of Research provides my department with $8,000, which can be used to hire, say, a post-doc or a finishing Ph.D. student to teach the class, and that has gone really well. We've gotten some great lecturers, and it has been really good for them in terms of their professional development, to have the complete responsibility for teaching a class, and then they can put that on their c.v.'s. These days, I think interviewing for faculty jobs, the fact that you've actually taught a whole class, not just been a T.A., is really important. A lot of places demand that now, so that has worked out pretty well.

But I also feel like I need to get back and confront undergraduate teaching and really get it to the point where I feel better about it.

Faculty Coordinator for the Natural Reserve System

Swent: When you came back, did you get involved with the Natural Reserve System right away?

Harrison: No, not right away. So when I came back to Davis in '91-'92, casting around for a place to start some research, I started working at Bodega again because I was familiar with those lupine bushes and their insects, and so I was working out there for a few years. And then about '96 or so I started getting tired of that and looking for a new study system, I thought about McLaughlin again. I think it was about '95, actually, that I started doing a bit of work out there again with a new graduate student, Amy Wolf.

So for a couple of years I was going out there and working, starting on this research program that I'm still now involved in, looking at serpentine outcrops as a model of a naturally patchy system and looking at how that landscape structure affects diversity and plant-pollinator interactions and things like that.

At any rate, we were doing that for a couple of years--

Swent: I was going to say, when you say you were going out there, what sort of arrangement did you have then with Homestake? They were still mining.

Harrison: They were still mining and still are, but they would pretty readily give permission. I guess initially we talked to Ray [Krauss] about it, to get permission to work there, but it was no big deal. They just said, "Oh, send us a copy of any papers you come up with." It was pretty informal. My student, Amy, was doing a lot of her work out there. About '96 or so I pretty much dropped the work at Bodega and started working full time on the serpentine plant project.

In 1997 there was a big meeting at the University Office of the President to discuss the financial future of the reserve system, which was in great peril at the time, and they needed a Davis campus representative. The Davis NRS was pretty low key at the time, and the person chairing the advisory committee, Sid England, was not a faculty member, and he didn't feel it would be a good idea for him, not being a faculty member, to represent Davis at this meeting, so he came by one fateful day and twisted my arm and, knowing my past involvement in the NRS, asked if I would go to this meeting.

So I did. We were just there to, I think, rubber-stamp what was already going on, which was an attempt to get some solid, system-wide funding for NRS, and a report came out of this. Eventually things improved.

Less than a year later, he and Jeanne Reese, I guess, who was Jonellen Goddard's successor, the administrator who actually ran the budget and the personnel--I guess they went to talk to Kevin Smith, the vice chancellor for research, and told him, Look, Kevin, your reserve system is in trouble. It's in very bad shape. It doesn't have enough staffing. There are some big problems on the reserve. The fundamental problem is the lack of faculty involvement, faculty leadership.

So they persuaded Kevin that he needed to appoint somebody to be the faculty coordinator, and so then the arm twist got put on me, and they asked me in 1998 if I would be the faculty coordinator, which meant chairing the advisory committee and reporting to Kevin and mainly, I guess, making recommendations to Jeanne Reese on how to spend the budget and how to manage the personnel.

That lasted for about a year. My biggest activity during that period was, sort of under Jeanne's guidance, developing a proposal to Kevin Smith and to our deans that laid out what the reserve system is and why it's important and what it could be and why it's falling short of that, and then spelling out a plan for improving it, including a budget--of course, the end result being hopefully getting money for it.

Literally, this took me an entire year. I guess it was academic year '88-'89. I wrote this proposal, shopped it around to all my faculty colleagues, begged them all to write letters of support. In the end, I asked eighty faculty members for letters of support and got letters from all eighty of them.

Swent: Well!

Harrison: Sometimes I had to ask five times, but everyone wanted to help; it was just a matter of how long it takes to get someone to write a letter. But they wrote great letters. And so I took this proposal with the eighty letters appended to it to all of our deans and all of our vice chancellors. I had never met any campus administrators before. I had always just completely ignored that level of reality. I got to meet them all that year and went to a lot of meetings.

In the end, the deans coughed up $40,000 a year, and Kevin Smith's office coughed up $40,000 a year, and the Office of the President coughed up a new $27,000 a year, so we got a five-year--it's only a temporary thing, unfortunately. A couple of years from now, I'm going to have to start lobbying for this again, but $107,000 a year in new money for five years.

So by the end of this very busy year, we had a search. The campus advisory committee had a job search, and we hired a reserve manager. She's now kind of a higher level person, in between the level of a reserve steward, who's more of an on-the-ground maintenance person, and me as faculty advisor. We now have a reserve manager, who's a Ph.D. level. She knows how to do the on-the-ground stuff, but she also knows how to write proposals and do more of the academic end.

And so now we're kind of a team. I work on the very academic and administrative end, and she works--her name is [Virginia] "Shorty" Boucher. She's sort of in the middle. And then we have our reserve steward, Dan Tolson, who has been with us now for, I guess, about three or four years. So we just collectively--the three of us basically look after these four reserves, including McLaughlin. In the long term, that isn't going to be a satisfactory arrangement because any large reserve with overnight facilities really needs a resident manager, and so the big hurdle that we still have to overcome to get McLaughlin functioning is we have to find the funding somewhere to improve the buildings, maybe build some new buildings, but also to have at least one full-time staff person.

I think in the ideal world, because it's such a big place and such an unusual place, we really need two people. We need a reserve manager and a reserve steward to run it. You know, they're in charge of everything, sort of managing the day-to-day realities of keeping off trespassers, talking to members of the public, showing researchers, "Here's where to find the plant you're looking for," sometimes helping researchers set up their plots, doing building maintenance, writing proposals to build new facilities. It's really the staff that makes these places work.

Since we haven't found the funding for that yet, that's really the biggest challenge for the next few years. And now the clock is ticking, too, because we've got this use agreement in progress, the agreement between Homestake and UC, which will cover the entire property, the whole 7,000 acres. It's a very complex document. Our lawyers have been working on it for the past year and a half, and they've not quite finished. They've almost finished now.

Then it's got to be approved by the Regents, and it's got to be approved by the Homestake board, but when that agreement takes effect, then we're going to have a lot of responsibility for the place. Where on earth we're going to get the funding to fulfill those responsibilities is still an open question, but we have a number of irons in the fire, and we'll just keep trying till something turns up. It's a big challenge.

Swent: It takes so long to do these things.

Harrison: It does. It really does. Things kind of got quiet for a lot of years, too. After the first agreement was signed in 1992, there was a period of about--well, what would it be?--eight years, I guess--six or eight years--when I think people were just sort of assuming that things would develop over time, but nobody, I don't think, really put a lot of effort into building up the momentum.

One of the first things that I started to do when I got involved in all this was to try to attract other faculty and students and people to working there, because we're never going to get anywhere convincing people to give us--

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Swent: You're never going to get money unless you have a variety of people.

Harrison: That's right. Yes, you need a lot of enthusiasm by the campus, by researchers and instructors, in order to be able to justify to anybody, whether it's to our administration or Packard [Foundation] or whoever else we might approach. The first thing they're going to ask is, Is this place important? Are people actually using it? Are they doing good stuff there? So I started advertising this place relentlessly among my colleagues and trying to get the word out to others.

As I think you've seen, one of the things we did to try to promote this was to create that handbook. We took all the environmental information that Homestake has collected over the years and turned it into kind of a natural history guide, so now if anyone expresses interest in doing research or teaching a class there, we can send them a handbook and they'll immediately be able to see what species are there and what habitats and a little bit about them.

Swent: I think it's also very interesting that you've broadened it out to people like the English department and not just--what do you call them?--the bugs-and-bunny people?

Harrison: That's right. That's right. Well, that's absolutely important these days, too. Intellectually it's very exciting to rub elbows with geologists and English professors, the whole gamut. And politically on campus if something is only supported by one slice of the community, it's not going to get very far. You really need that broad "buy-in," as the administrators like to call it.

Swent: You need more than just the butterflies.

Harrison: That's right. That's right. But it's fun, too, because I think reserves have a tendency to pull together these interdisciplinary kinds of interaction, because people are focused on a place. They might come to that place to study the rocks or the plants or the relationship of people to nature, and because you're out there at the same site, you end up talking to each other and sharing information about it, so I've certainly got to know my colleagues in other fields much better through the reserve system than I ever had before. Naturally, the tendency is to just talk to the people in your own department, but the reserves have really forced me to think more in interdisciplinary terms.

And then the other thing that's been really fun for me and professionally rewarding for me about it is that all the interactions with people outside of academia, the fact that I now come into regular contact with the whole range of people, from the Homestake folks to ranchers to BLM people to nonprofit environmental groups, government people working in the area, has been really enriching because I guess I'm professionally labeled as a conservation biologist, which is just the branch of ecology and evolution where people are supposed to be studying questions that have some relevance to conservation. And yet if you're only doing that within the confines of academia, I think there's something lacking.

Actual conservation takes a lot of interaction between scientists and land managers and private landowners and so forth, and I didn't really have that interaction as part of my daily professional life until I got involved with this. So it has really made me think about things differently and changed my perspective on a lot of things.

Swent: You said that Sid England is not part of the faculty. What is his role?

Harrison: He's an environmental planner for the campus.

Swent: But not technically a member of the faculty.

Harrison: That's right, yes. He has a Ph.D., but he's not a faculty member. So, for example, he couldn't go to our vice chancellor for research and say, "Hey, look, Kevin, you need to put more money into the reserve system." That kind of thing, only faculty can really do, in our elitist system.

Swent: You have to know all those little rules.

Harrison: Yes. Unfortunately there's kind of a hierarchy.

[tape interruption]

Funding the McLaughlin Natural Reserve

Swent: We're continuing after a break here. I think it's time to talk about some of the contacts and activities that you've gotten into as a result of this that are off campus. Is there more that you'd like to say about the relationship with the NRS and Homestake, how that developed through the years?

Harrison: Well, I think that the biggest problem or the biggest challenge that has come up during the time I've been involved leads to the whole question of how to get funding for the reserve, and unfortunately, I think a lot of the reason that people were complacent about this for some time is that on our end, on the UC end, we all sort of optimistically expected that Homestake was going to provide an endowment.

This was a possibility that Ray had raised in conversations over the years. One of the ideas that he had put forward was that the company was going to sell off the Knoxville Ranch, which they had paid something like $2 million for from the Gamble family, only to find that the ore deposit stopped at the property line and there was no gold to be found on what used to be called the Gamble Ranch.

And so the hope and the expectation had developed, through these conversations, that Homestake might endow the reserve with something like $1 to $2 million, and this, as the basis of an endowment, would generate enough money for the staffing of the reserve and would help attract more money from other sources and get the whole thing going.

I wasn't there for a lot of those conversations, and so I don't know what the exact words were that were used, but I think Ray had hopes that he could persuade the company of this and that what he conveyed to the UC had become in people's mind a relative certainty, however that happened. And, of course, it didn't happen.

I guess, in retrospect, probably if the price of gold had gone differently, a lot of things could have been different, but about the time that I showed up on the scene as the new faculty coordinator and then director for this, it was just

Sylvia McLaughlin and Susan Harrison, 1999.

Susan Harrison in oak grove.

about the time that it was becoming apparent that there was not going to be an endowment. This was looked at as fairly catastrophic by everyone from Alex Glazer, the director of the reserve system, on down.

So it has only been two years now that we've been wrestling with the fact that we have this very big reserve that's going to be relatively expensive to run and at this point really no source of money outside of our existing small budget, to run it. And so this is a real challenge in a lot of ways. We're trying lots of different angles of possible proposals to Packard [Foundation] or to NSF [National Science Foundation] or to other places.

The problem is nobody wants to provide money for ongoing infrastructure. It's just a very hard thing to get. Campus administration will provide money to get new programs started, but they hate to commit permanent money to it to keep things going. And foundations and other sources generally don't like to pay salaries. They might help with land acquisition, or other foundations might help with a building, but absolutely no one wants to pay the ongoing basic infrastructure costs, especially the salaries. Everyone from the outside sees that that's the university's responsibility. The university just says, "We'll get things started, but then you have to get outside money to keep things going." So it's a problem that we haven't quite figured our way out of yet. If there has been a disappointment or a setback in the whole relationship, I guess it has been that.

Swent: I gather you feel that Homestake had a commitment that they sort of backed away from?

Harrison: No. Like I said, since I wasn't there, I don't know what words were said or how it all developed, but I know for a fact that there were people in the UC who viewed it as something that was going to happen.

Swent: It was their expectation?

Harrison: Yes, that's right. How that expectation exactly came into being may have been a case of just optimism that didn't succeed. Clearly, having the price of gold do so badly during all this time did not help at all.

Swent: And changes in personnel as well.

Harrison: Yes, yes, that's right.

Swent: Ray has been the one person who has been there through all the time, actually the only one, really.

Harrison: Yes, yes, that's right.

Swent: It's a shame.

Harrison: Well, I think in the end it's going to work out in one form or another. We may have to go through some lean years where it's not a very lavishly equipped reserve, but the fact that there are buildings and roads and fences and gates there is not a trivial endowment in and of itself, and although there isn't this monetary endowment, they've been really good about giving us help on things like the fact that right now we're getting a free ride with all the utilities and road maintenance and things like that. It's very nice.

If we had had to pay the costs of what we've been doing out there for the past couple of years, we couldn't have done it. So I think that with a little bit of a springboard, a little bit of a time period during which they're subsidizing us in that sense, we'll be able to develop some momentum, get more people using the place, apply for some grants. One way or another I'm pretty sure we'll be able to find a way to make it go.

But it seemed like it needed to be said for the record that that was what happened.

Swent: You were just telling me off the tape that there are people using it, that you set up sort of a dormitory facility there.

Harrison: Yes, that's right. Homestake let us, about two years ago, convert their old environmental management building into a field station. It's a warehouse just behind the guard station, and it has got offices at each end, with a warehouse space in the middle, and so at one end our reserve steward built a kitchenette, and there are two bedrooms and a work area. It can hold about six people comfortably, or any number of people uncomfortably. It's a big building, and we can store a lot of equipment and things there, too. And so that has been really helpful. And Homestake has paid all the utilities. We haven't had to pay any of the ongoing costs there.

Any time in the next few years, it sounds like, we can move our field station from that building into their administration building, which is an even better building. It's got--I don't know--a couple of dozen rooms, two showers, lots of space to create a field station. So that building will get us through, I think, a few years of not having money to build anything fancy.

Swent: That's the one that's up the hill by the processing plant.

Harrison: That's right, yes, on top of the hill. So it's not an ideal location in the sense that I think if you really want to attract people to a reserve, you need a building that's in a very beautiful location where people can go and stroll through the oak trees at night after dinner, and being right next to the processing plant is not perfect. But at least it's a good building, and if we get money to build buildings we would probably put them somewhere in between the guard post and that administration building, along the entrance road. It's an attractive spot. Once the processing plant is torn down, too, it will change a lot. It won't have that industrial look that it does now.

We also use the core shed area a lot. When classes go out for overnight visits, rather than staying in the field station, they often camp at the core shed because it's a pretty spot. Our steward built a water tank out there and a small kitchen, and when classes go out there, he moves a stove and refrigerator to the kitchen, and we have port-a-potties there, and so it's a pretty good campsite. And it's a real pretty place to be based because you can take walks in all directions into natural habitat, and it gets you away from the industrial areas a bit more.

Swent: Wasn't this a ranch at one time?

Harrison: That's right, yes, yes. They call it the Morrell-Hand homestead. The Morrells grew hay and the Hands had hogs, and you could see old remnants of hayfields and hog pens if you look closely as you wander around. And I gather, too, that one of the neighbors, who I'm sure you've met, Marion Onstad, is working on some interviews of people in the area, including a woman who grew up on that homestead, Elda Parks, who was Elda Morrell.

Swent: I'm glad to hear that.

Harrison: There will be some more information coming in.

Swent: And this dormitory that you mentioned is the one that you had named the Ray Krauss Field Station, isn't it?

Harrison: That's right. That's right, yes. We wanted to commemorate Ray as the person who got all of this started. Over his objections, I should add. [the naming of the field station]

The Blue Ridge-Berryessa Natural Area

Swent: What's the relationship now with this Blue Ridge-Berryessa and the NRS? Is there a connection there?

Harrison: Well, as you know, the Blue Ridge-Berryessa group is something that Ray started after he left Homestake as a way of, I guess, creating a regional consortium of people and groups who were interested in long-term conservation in that area, recognizing the fact that it's a little-known area that still has a lot of undeveloped land and that there are a lot of people coming from different directions, agencies and nonprofit groups and the UC, who are interested in seeing the area keep some of its wild, open space attributes.

I think these meetings have been real successful, just because they get a group of people with some common interests and information to exchange together once a month, and a lot of simple business that we need to do is, say, talking to BLM or talking to [the California Department of] Fish & Game or whoever, we can do at these monthly meetings. I think that's why they've been pretty successful.

Also, the agencies themselves need to have a certain amount of public input into their activities, and so they use these meetings as a way of saying that they're talking to their stakeholders in the region. So that has been helpful for us.

In some cases, when the UC reserve system is applying for funding or something, for something that we're doing at McLaughlin, it's really helpful to be able to get a letter of support from Ray on behalf of the Blue Ridge-Berryessa group, because it shows that we're not just inwardly-focused academics; we're tied in with a group of regional stakeholders. I think we all get some benefit out of being able to say that we're talking to each other.

Swent: And that involves the local ranchers.

Harrison: Yes, some of the local ranchers attend those as well, yes.

Swent: I didn't realize that you met monthly.

Harrison: Yes, yes. You should come sometime. You can record one for posterity, yes.

Swent: It takes a lot of your time, though, doesn't it, to do that as well.

Harrison: Well, I don't go to every meeting. Now that we have Shorty as the reserve manager, she and I can trade off things a lot, and so sometimes we trade off going to those meetings or to other meetings. It's really nice not to have to do this all myself. And Sid England actually stays involved, too. He goes to those meetings sometimes.

The Napa County Land Trust

Swent: Do you want to talk about the Napa Land Trust?

Harrison: Okay, yes. The land trust has been a partner with the UC reserve system at Quail Ridge, another one of our reserves, which is a peninsula on Lake Berryessa. They have a conservation easement on some of the property there. So we had a connection with them through that, and then somewhere in the process of creating the use agreement for McLaughlin, I think it was Ray who raised the idea we could have a conservation easement on the property that would be held by the land trust.

There wasn't a real strong reason to do that because what a conservation easement basically does is prohibit commercial development, and they were not going to do commercial development anyway, and easements also provide tax breaks, but the university wouldn't have to pay taxes on that property anyway. So really the basis of it was partly a goodwill gesture and sort of a political move to have another regional group that's interested in what we do out there.

And also, I guess, one of our legal advisers in the UC system felt that perhaps it was better to have an outside party being the watchdog over the conservation values of the land, rather than us claiming that we're going to be our own watchdog. So the land trust was sort of brought into the deal. No firm decision on this was made until just last year, when there was a complicated transaction to try to save the Knoxville Ranch, because Homestake was about to put the Knoxville Ranch on the open market.

Ray had been trying to arrange for it to be sold through a conservation organization, to be owned by one of the agencies, but the deal was taking a while to go through, and the company was getting impatient, so a deadline was set and missed, and it looked like there was a developer interested in buying the land. They got Packard Foundation and others out there on a field trip and got them interested in it, and eventually the land was bought with money from Packard and the Wildlife Conservation Board, bought from Homestake and given to Fish & Game--which is great, because it's now 8,000 acres of protected public open space.

But somewhere along the way, Packard said they would only provide the money if they could also, in the package, fund a conservation easement on the McLaughlin property, because that way they would get a lot more acreage for only a small amount more money, so at that point we were firmly joined to the Napa Land Trust, because that was part of this deal.

So anyway, that's how that came about. But it has been a neat relationship. It's a very good organization. They've been evaluated as one of the most effective land trusts in California or anywhere, I guess. Just over a year ago, they asked me to be on their board of trustees, so I've been a pretty active participant in a land trust outside of the whole McLaughlin connection for the past year.

I think one thing that makes it an effective group is that there's a lot of wealth in Napa Valley, and so you can get people to donate, and you can get some pretty high-powered people to donate their time. Some of the board members are lawyers and winery owners and retired bankers and people with a lot of means and knowledge and influence.

It's a hard thing. The whole land trust movement is a way to encourage conservation to happen on private lands, but you need to monitor that, and you need to legally enforce that, and not all land trusts have nearly the wherewithal to follow though on the easements that they hold, and so they don't really have good control over what goes on on the land. But Napa Land Trust has been pretty good at that.

One thing that they haven't done is a lot of scientific analysis of what they're doing, and that's what I'm trying to help contribute, in the sense that a scientific approach to conservation might begin with asking, Where are the best areas in the county as far as biodiversity, and making those targets for either land acquisition or easement acquisition and so on. So I've worked with the land trust and with a group of researchers at Davis to help get a biodiversity analysis of Napa County going, so that the land trust can be more oriented toward preserving the best quality natural habitats and the places with the most rare species and things like that.

But the organization has two parallel missions. One is to protect natural habitats, and the other is to protect vineyards or any agricultural land from being developed into suburbs, and sometimes those two missions can be very different. Sometimes they even conflict, because if someone is proposing to turn natural habitat into vineyard, I would call that a loss for conservation, but if you're an organization that cares about agricultural open space, you don't necessarily criticize people who are doing that because that would upset the agricultural community.

I've had to learn a different perspective on conservation, that some people see it in a very different light. For some people, preserving any kind of open space, whether it's vineyards or natural habitat, is equally fine. So there's a lot of interesting mutual education going on there.

Swent: And the Napa Valley is so different from this other part of Napa County.

Harrison: Yes, that's right. People in Napa Valley oftentimes aren't very aware of what goes on in the 60 percent of the county that's not the valley, and Knoxville is sort of the far back of beyond for them, literally. People sometimes refer, in the land trust even, refer to it as back of beyond, so I and a couple of the other board members are kind of the cheerleaders for preserving the county outside of the valley. Sometimes the organization has put a higher priority on the valley because it's the viewshed that most people experience, but we feel like the opportunities to preserve relatively large chunks of relatively wild land only exist in the northeastern part of the county.

And it's being lost pretty fast, too. A lot of development is taking place there, so it's not as though those areas are just remaining unchanged forever, by themselves. By agitating for more emphasis on biodiversity, I'm also partly agitating for more emphasis on, say, Knoxville, Pope Valley, Snell Valley, Berryessa, that whole side of Napa.

Swent: Lake Berryessa--is it entirely in Napa County?

Harrison: The far side of it, I guess, would be--let's see, Yolo and Solano? I'm not sure where the county line is.

Swent: I'm not sure, either.

Harrison: I might have a map [starts to look through papers]. I don't have it here, though.

Swent: But it has BLM land mostly around it.

Harrison: That's right. That's right. Away from the shores of the lake, both on the east side and the west side, are some pretty wild areas owned by BLM, with very little public access because a lot of the BLM land is landlocked, and then the actual perimeter of the lake is owned by the Bureau of Reclamation. There's a move afoot to transfer the whole thing into BLM's hands and have them manage the whole operation there, the lake and lake shore and everything else. That's a big issue that's in progress right now, which we hear about at these meetings.

Swent: I'm sure. And the level of the water determines where the shore is.

Harrison: Yes.

Swent: There are a lot of issues there. So the Napa Land Trust meets every month also?

Harrison: Every month, yes. Well, meetings are my life.

Swent: I guess so. I appreciate your giving up a day here. That's pretty precious. Where do they meet?

Harrison: They alternate between meeting in Napa and then meeting someplace up valley, so that they won't be too biased toward one end of the valley or another.

Swent: But it's always in the valley.

Harrison: Yes. It's never in the eastern part of the county. In fact, I offered to host a meeting at McLaughlin sometime, but that hasn't happened.

Swent: Nobody wants to go there.

Harrison: It's too far from anywhere important. [laughs]

Swent: Is it an all-day meeting?

Harrison: Oh, no. It's just an evening.

Swent: An evening.

Harrison: A couple of hours, yes, yes. They have a really good staff who get most of the work done, and so the board just kind of reviews what the staff is doing and makes policy judgments and things, but the real work is done by the staff.

Swent: But still, that's quite a ways for you to go, from Davis to Napa, for any of the meetings.

Harrison: Well, there has been someone I could carpool with up until now, but unfortunately, she's about to rotate off the board, so my attendance might not be quite so good.

Swent: You get home pretty late after one of these meetings.

Harrison: Yes.

Swent: Do you tie in at all with conservation interests in Napa?

Harrison: Napa doesn't have county parks. They only have, I think, two state parks. No regional open space district. So the land trust really has to cover a lot of bases. We're really sort of filling in the gap. It doesn't have any other mechanisms for getting public open space.

The Sixteen Fire Leads to Definitive Research on Fire Ecology

Swent: What about the big fire a year ago?

Harrison: Yes, it was last October, October 16th, 1999. It started on Highway 16, so they call it the 16 Fire, because of the date and because of the highway. There was an arsonist. I guess it was the third fire set by the same arsonist that summer. This was by far the biggest one. It was about 40,000 acres. Went all the way from Cache Creek down almost to the upper end of Putah Creek, above Berryessa. It burned from north to south in a big swath, a long, narrow swath. It hit about 1,800 acres of the McLaughlin land, the Homestake land.

It was ironic: It happened on the same night when the NRS reserve managers from all around the state were having their annual meeting, and it was out at Bodega this year. And so we were all out there Saturday night. The reserve managers were having their big annual costume party, and Shorty and I dressed up as miners. We had boots and picks and shovels spray-painted gold and all kinds of crazy stuff. Little did we know, at that very moment the fire was burning through the reserve.

But the next morning, as I was driving back and I stopped off in Sonoma, I could see the cloud of smoke and ash raining from the sky. You could tell it was a really big fire. I guess that same day we heard that it had hit quite a bit of the Homestake land. Of course, my immediate reaction was to be pretty concerned. I wasn't able to get out there until about three days later because all the roads were closed.

When I first got out there, the fire was still smoldering in places. I remember seeing one of the big ore-hauling trucks back by the reservoir that had been rigged up as a water truck, and so it was squirting this enormous jet of water. They were going around putting out spot fires. But none of the buildings there got damaged. One newly built pipeline down by the Knoxville town site got destroyed, and that was about it as far as economic damage.

As far as research goes, at least for me, it turned out to be a real benefit, and for a few other people, too. I subsequently started digging through the literature and realized that even though people have written a lot about the floristics of California serpentine plants--we know what species grow on serpentine in which parts of the state and so on--nobody had really done anything on fire ecology and serpentine.

It's really surprising. In fact, I never even picked up any references to someone just saying, This plant is typically only found after fires. That was surprising, because in non-serpentine chaparral it's well known that there are many species that you only see after fires, so-called fire followers whose germination is stimulated by fire in some way. It can either be stimulated by the smoke or the heat. And because chaparral is this sort of dense community where not much light reaches the ground, there's a lot of species that just can't grow there until a fire comes along and opens things up, and then these herbs, wildflowers come in and flower for a few years, put a lot of seeds into the soil, and then the chaparral closes in again and you don't see those species again for another fifty years, or until the next fire. And so they're surviving as dormant seeds for decades.

This is kind of a well-known phenomenon for chaparral. It seemed really surprising to me that nobody seemed to have looked at that in serpentine chaparral, and so after the fire, a post-doc named Hugh Safford and I--

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Harrison: In the spring of 2000 we went out and established plots in burned and unburned serpentine and non-serpentine chaparral and grassland. I studied 100 grassland sites, and Hugh studied 80 chaparral sites, and we're just beginning to write up the results now. We're basically asking the question, How much does fire affect the plant diversity within chaparral and grassland? How do the effects of fire differ between serpentine and non-serpentine habitats?

We're hoping this will be a definitive paper on the subject, since there haven't been any others! It's fun to be doing something so basic. I think it isn't often in ecology these days you get to study some really basic thing like that, because a lot of that kind of natural history type work has already been done. But in this case it was just seemingly a hole in our knowledge.

It has been a very fun project, a very exploration-oriented kind of study.

Swent: And so you've been able to continue with some research as well as all your other activities.

Harrison: Oh, yes. Still do just as much research as ever. It seems like in our system, if you stop doing research, things just won't go as well. If you do a lot of research, you can get away with anything. People treat you really well. If you slack off on the research, then you become almost like a second-class citizen. I mean, that's not the reason. The real reason is I just enjoy the research. Always been motivated by just really enjoying it.

Swent: Do your students get involved with it? Do you have student help?

Harrison: Yes, that's right. Well, students do a combination of, say, working with me on a project that I have a grant for and working on their own, independent projects that might be something closely related. The trick with graduate student projects is to strike that balance where part of what they're doing is helping me with something that I have grant support for them to do, but also something that lets them develop an independent project and work out their own ideas and things like that.

But that has been really fun. I really enjoy that aspect of things. I have about five graduate students now and two post-docs, and we're all doing things loosely related to serpentine plants, grassland, invasive species, and kind of a complex of related topics. Most of our projects center in this area, including McLaughlin and the area around it, so we have a lot of fun just comparing notes on what we're finding out there. At the same time, the students have a lot of independence, too. At least I think so.

Swent: Where do you go with this? Where will it be published, or do you know?

Harrison: Well, there's a journal called *Ecology*. It's a pretty basic, good journal in our field, and so I think we'll probably end up doing--we tried to write it up as one paper, but the chaparral and grasslands just made the paper too big, so I think we're going to split it up into a chaparral paper and a grasslands paper and have it be sort of part one and part two, and submit them together to *Ecology*, and hopefully they'll come out as a back-to-back series, if we do a good job of writing it up.

Swent: And who is Hugh Safford? Is he a graduate student?

Harrison: He's a post-doc, so he has finished his Ph.D. and hasn't got a faculty job yet. And he has a geology undergrad degree, so it makes him a good person to collaborate with, because a lot of times we're out there in the field, scratching our heads over, Is this serpentine? What is this? It helps to have a geologist around.

The Bureau of Land Management and Off-Highway Vehicles at Knoxville

Swent: It sounds good.

Are you ready to move on to the BLM?

Harrison: Sure.

Swent: I don't want to rush you.

Harrison: Well, I was just trying to think of other things related to this, but [pauses]--yes, sure, let's move on.

Swent: I don't want to leave anything out. Let's start with BLM and see where that leads us. You had a long, bumpy relationship with the BLM.

Harrison: Certainly.

Swent: The Bureau of Land Management. They own a lot of territory up there.

Harrison: Yes. One of the great things about McLaughlin is not just the Homestake land itself but the fact that it's right in the middle of now over 100,000 acres of public land. It's all very wild and all accessible to the public, so having a reserve right in the middle of that is a great opportunity to branch out and do work all over the region. The BLM is very open to that, very enthusiastic about having researchers work on their land and so on.

But the irony is, everything to the east side of us is the Cache Creek Wilderness Area, and the BLM treats that as sort of one of their prized areas because of the bald eagles and the bears and so on. They declared it a wilderness area, and they have built hiking trails, and they have public events, and they're obviously very proud of it and take really nice care of it.

But on the west side is Knoxville, and Knoxville has been a problem area for years and years. Dating back to 1973, their management plan for the whole region--the BLM designated Knoxville as an off-highway vehicle area. Knoxville is about 17,000 acres, and it was already being used by people for off-highway vehicles and shooting, and so they just recognized what was already going on there, and they said, "This shall be the preferred use for this area."

And in 1984 they amended their plan and said, well, off-highway vehicles and mining will be the dominant uses in this area. So they always regarded it as kind of the wasteland, the place that sort of counterbalances the environmental values that they protect in the Cache Creek area.

To those of us who are plant oriented, that's a completely wrong set of priorities because Knoxville is actually incredibly special. Botanically it's one of the richest areas in the world, probably, for plants that are restricted to serpentine soils. Botanists have been going there for over fifty years to study serpentine plants. A lot of the people in the region, a lot of scientists are aware of it as a really special place where you get this very diverse mixture of serpentine and other substrates and many different types of vegetation, all sort of interdigitating. Really rich, especially in serpentine plants, but other things as well: insects, aquatic life.

Thanks to some of the work done by Homestake, we have actually some really good species lists and records for some of the wildlife and plants in this area, and so we know--that's part of the reason why we know how rich it is. And so it seems crazy to designate this for environmentally destructive activities. But once these things are designated, they're really hard to change. A certain amount of inertia builds up.

For years, the manager of the Knoxville area, a fellow named Jim Cooper, was the aggressive promoter of OHV recreation. The state of California has a program that manages and has in the past served to promote OHV recreation. It's called the state Division of Off-Highway Vehicle Recreation. They give out grants to BLM and the Forest Service and other agencies to appropriately manage OHV activity that's occurring on their land.

But under Cooper's leadership and with this money coming from--they sometimes call it the "green sticker fund," it encouraged the continuation and expansion of OHV use there. And unfortunately, it has never been well managed or well patrolled, and people go off the trails all the time and do a lot of damage. In recent years, the biggest problem has been all the uncontrolled shooting that goes on there. People go there because they know it's a place that they will never see a law enforcement officer and they can get away with doing just about anything. I guess people need a place to go and be anarchical, but it's just getting too crazy out there. There are a lot of automatic weapons, and people go there to blow up propane tanks and just any kind of thing you can imagine. And there has just never been patrolling or enforcement.

When BLM receives grants from the "green sticker fund," they're supposed to put up barriers and signs and things to control where people go, but they never really have done that, or haven't done very much of that. And so the place has really deteriorated, and the neighboring landowners have been angry at BLM for years. They tried to block implementation of a management plan that was developed for Knoxville back in about the early nineties. It was held up in various appeals for years, and then it was approved, and then they threatened to sue, and Napa County threatened to join in the lawsuit, so things have sort of hung in suspended animation for years, with not much going on, because this plan was so tied up in controversy.

And then meanwhile, the UC crowd started to increase its use of the area about two years ago, and now--conflicts happen when people get shot at or people go off road and damage habitats or commit vandalism. It's UC people who are experiencing that, as well as some of the local landowners, and so we've gotten more and more involved in the picture, and I've become deeply involved in it after seeing a lot of things happen in the past few years.

Swent: Why "green sticker fund"? What is the green sticker?

Harrison: It's a registration sticker that you're supposed to put on your off-highway vehicle. The original idea of the "green sticker fund" was a user-pay system, where people would pay a registration fee and that money would be used to manage and control and contain the sport. But no sooner was this program created in 1971 than people decided that the registration fee was not going to be enough to fund it, so they started adding a big chunk of--a chunk of the state gasoline tax as well, so now this program has a huge amount of funding because it's getting a percentage of the state gasoline tax, which is supposed to be proportional to the use of gasoline by these vehicles.

But apparently the numbers have been juggled pretty severely to try to make the program more lucrative. And it moved away from its original mission of controlling and containing the sport and became more of a system for promoting the sport. So the regulations encouraged more areas to be opened up, and they discouraged areas from being closed off for environmental rehabilitation, so it really became a sort of out-of-control thing.

But in the last two years, environmentalist lawsuits have really curtailed it and forced the people who administer it to really rethink what they're doing, and if they don't clean up their act, they're going to get nailed by lawsuits again. And so now we're in the middle of a time of great upheaval in that program.

And meanwhile, out at Knoxville, there are more and more people who care about taking better care of the place, and so events have begun to really accelerate in the past year. Partly because Ray's BRBNA [Blue Ridge-Berryessa Natural Area] group have been in frequent contact with Ukiah BLM folks. At one point, with some encouragement from them, I went ahead and developed this proposal that nominates Knoxville as an area of critical environmental concern [ACEC], which is a designation that recognizes that a place has really special environmental values that need to be protected.

This nomination is now on the table for discussion. It hasn't been acted upon yet, but I've been repeatedly told by the BLM guys that they will put it forward; they will act on it. But meanwhile other forces are at work as well, including the fact that the Napa County supervisors have yet to decide whether or not to go ahead with a suit against BLM. They're not happy with this situation, because of the environmental damage and also because of the law enforcement implications. They don't want to pay the cost of law enforcement on this godforsaken, lawless area. And so they've been opposed to what BLM is doing out there, but they hadn't decided whether there was a legal basis for pursuing.

In the past few months, they've hired an attorney specializing in land use issues to analyze the situation and give them an opinion. The attorney's opinion is that this 1973 plan is outdated and legally should be required to be replaced. And if that happens, then that will call into question whether there should even be OHV recreation there at all. And so the supervisors have just written to BLM to tell them that they, the supervisors, would like to see this plan replaced and they would like to see the ACEC proposal acted upon, that they support that and that they think it's time to consider other uses for the area, like hiking and camping and birdwatching and other things that people don't tend to do in a place that's full of off-highway vehicles and bullets.

Swent: And people shooting.

Harrison: Yes, right. So I'm guardedly optimistic that things are going in the right direction, because the landowners, the supervisors, the scientists, everybody is lined up in favor of this, and it's really only a small number of people that go there to do these destructive things. It's mostly young guys in trucks that go and tear things up. Unfortunately, they like to roar around in muddy places, and so they tend to head for the real sensitive habitats and do a lot of damage to them. It's a form of recreation, I think, that there just isn't a place for on public land. Personally. It's just my opinion.

Swent: Well, it's hard to find a justification for that. It's not anything you need to do.

Harrison: Yes, that's right. That's right.

Swent: It's twelve o'clock. Let's take our break.

[tape interruption]

Swent: We stopped for lunch, and now we're going to continue talking about BLM. We've got a wonderful report here called

"Outstanding Environmental Values of the Knoxville Public Lands." And you've been working on this for a long time, obviously.

Harrison: No, I really just started working on the report about last July or August.

Swent: And this you're presenting to the Napa County Board of Supervisors?

Harrison: Yes. There's going to be a meeting of the Board of Supervisors on January 30th, 2001, to talk about the future of the Knoxville area and for the BLM to tell the Napa supervisors what they have done or what they're proposing to do to clear up the problems at Knoxville, mainly the shooting and the uncontrolled OHV recreation, and also for the supervisors to tell BLM what they think should happen.

The context of this is that there's a possibility of litigation against BLM by the county and by these local landowners who are unhappy with what's going on there. Up until now, the question has been would Napa pursue such litigation and under what circumstances, and is there any legal basis for the county to criticize what the feds are doing there, but they have decided that there are grounds and that they do want things to change, and so they commissioned a lawyer, who gave them the legal opinion that what the BLM is doing is based on an outdated plan that has to be replaced.

And so this is all going along anyway. As it was beginning to unfold, I had been in touch with both Rich Burns, who is the Ukiah area manager, and Phil Damon, who is I guess their head natural resources management person in that office, talking to them about Knoxville and obviously expressing my concern both as an individual being concerned about the environment there and how special and fragile it is, but also my concern on behalf of the reserve system, because now, in the past couple of years, we've seen so many people start to go up there and do research.

It becomes a real question: How much of a threat does the lawlessness in Knoxville pose to our ability to have a reserve there? In the worst possible case, I can imagine some terrible incident happening that would pretty much force us to shut down, or at least it would be a terrible thing to have anyone get injured by shooting or by some sort of unpleasant confrontation with out-of-control people in Knoxville. So we've been worried about what all the escalating problems at Knoxville might do to the reserve.

And, on the more positive side, we see an opportunity here to forge some kind of alliance with BLM to have perhaps part of the Knoxville land be designated as a research natural area, which is a very protected designation for public lands and that would set aside, say, a chunk of the land to become an honorary part of the reserve, an area that might be managed especially for research.

In general, I think there has been really good will between UC and BLM. They would like to cultivate a better relationship with scientists and academics, and we would like to cultivate a better relationship with the people who are managing a majority of the land in the area. So we have a lot of common interests, and the people in Ukiah are pretty nice and reasonable and willing to listen to us.

But they're also under a lot of constraints. They get a lot of pressure from all sectors of the public whenever they change the way they do things, and if they were to shut off some areas of Knoxville to OHV recreation, they would get a lot of grief from not just the users, which are relatively few in number, but also from the organized OHV lobby.

I think they just have institutional constraints, too. It's hard for them to change course very much once a plan has been established for an area, so they don't want to do that if they can avoid it. They would like to just fix the situation by having a little bit of law enforcement, a little bit of extra attention, but they don't really want to fundamentally change what they're doing. But I think the pressures on them to change more fundamentally are increasing because it's coming from the country, from the landowners, from those of us at UC who have gotten involved.

So far, things are looking kind of promising because the reform of the state OHV fund is leading to a situation where they're not going to be able to count on just getting money to manage it as an OHV area anymore. They are already going to have to rethink that because they won't get those funds after a couple of years from now.

That, combined with this threat of a lawsuit from Napa County, I think is going to lead to some changes. We'll see what happens, but--

California Division of Fish and Game

Swent: You mentioned Fish & Game. That's a California agency.

Harrison: That's right, yes.

Swent: Where do they come into the picture? That's state.

Harrison: Yes. They come into the picture because Homestake was selling this ranch that used to be part of the Gamble Ranch that people have now started calling the Knoxville Ranch, and Ray was very concerned with making sure that this fell into public hands and was maintained as open space and not sold off for development.

Originally, one of the ideas was that it might be bought by conservation money and given to BLM, but as I understand it, one reason that didn't happen is that the local landowners, including the Gambles, are not very happy with BLM because of all the bad stuff that has happened at Knoxville, and so Fish & Game was identified as a potential partner instead. Not that--I don't think BLM minded that, but anyway, that's how it happened.

Fish & Game is also very actively trying to expand the elk herd in the area. So over the ridge, on the Cache Creek side, is the reintroduced herd of Tule elk, and Fish & Game would like to transplant some elk over to the Putah watershed side of the ridge. Now that they have bought the Knoxville Ranch and they're working on acquiring another ranch across the road called the Lauff Ranch, then they would think about putting elk over next to the reserve, which would be very exciting for us. It means we could be driving to and from the reserve and see elk along the road. That would be pretty exciting.

Swent: Do elk damage the plants?

Harrison: I don't know. We'll see! I've never been in elk habitat before or worked around elk before. But I doubt the densities would be too high. Compared to the densities of cattle that have been out there in the past, I imagine the elk wouldn't have as much of an impact.

So it's exciting to see a lot of land going into public ownership in the area. Now if we could just get them to treat Knoxville better and start treating it as--

Swent: There is grazing on the Knoxville area.

Harrison: There was grazing on the Knoxville Ranch, but that has ended now because of the transferring to public ownership.

Swent: But people graze on BLM land.

Harrison: Only under leases, special agreements, so there is the possibility that Fish & Game could decide this land should be grazed and they could give a grazing lease to the fellow who has been grazing it all these years, but it doesn't sound like they're going to do that. They want it for game habitat; they don't want it for cattle.

And there has been also grazing on Homestake land, and we're just now in the process of transition that the UC will begin to manage that, and we'll more or less be the ones to decide what grazing, if any, we want, where. So we may change the existing arrangements, which are that the Onstads are grazing the north end, and this couple, the Underwoods, are grazing the south end. We have yet to figure out where we're headed with that. We're probably going to keep some grazing, but we might want to remove it from other places.

Homestake grazed it for fire control and just for good relations with the neighbors.

Swent: They're not grazing in the areas that you're doing your research?

Harrison: They are, actually, and that has become a problem. There's a big new program, research project that got funded by the Mellon and Packard foundations that involves about six faculty and a whole bunch of students, and that project, which is looking at plant evolutionary responses to mosaic environments, is going to take place in the area just north of Knoxville, a place we call the white seep. It's got a spectacular hot springs formation, ancient hot springs formation.

And that area is still being grazed. We've just discovered in the last few weeks that that's going to be a big problem because people are starting to put out experiments, and then the cattle trample the flags and eat the plants and everything. It's too late to do much about it this year because the lease has already been signed, but I think that beginning next year we may have to end that lease because it's not going to be compatible with the experiments. And it's really expensive to put up fences to protect small sites. You have to build little exclosures.

Swent: Are deer a problem?

Harrison: They're not a big problem. There's deer around, but there's not very large numbers of them.

Swent: They're not as bad as cows.

Harrison: They browse on woody plants more than they graze on grass. The cattle, of course, just graze things down to the ground if you give them a chance.

Swent: They're bigger, too.

Harrison: Yes, that's right, they trample and they spread weeds. That's a big concern, too, the way they move weeds around.

Swent: More than deer?

Harrison: Oh, I think so, just because of the densities of cows are so much higher. Deer populations are relatively small, and they just don't do as much damage in general, I don't think.

Swent: So you're hoping that this meeting in January will declare this as an ACEC?

Harrison: I don't think they would be able to do it quite that quickly. I think the rules are that they would have to propose to do so and then have a sixty-day public comment period, and then make a decision. But now what Napa County is demanding would go even farther than that, because it would force them to go back and change their whole regional plan for the area, and so that would take probably a several-year process of writing a new plan and putting that out for public comment, and then implementing it.

If Napa County gets its way, if BLM decides to give in to the demand that they change the plan, everything might take a lot longer to happen. For example, the ACEC proposal, rather than happening this year, might not be able to be acted on for a couple of more years. On the other hand, that might be better because it might be a more comprehensive change, instead of a smaller change. But I don't know. I'm getting into new waters here. I haven't had the experience of these issues before, and I don't know what all the possibilities are that might play out.

Swent: But in the meantime it would continue as it is.

Harrison: Well, I'm worried about that because if bigger changes happen but they take longer to happen, that also means that there's going to be more years of craziness going on up there and the vandalism and shooting will continue, so what I hope is that BLM will both make these larger changes in the long term but also put more resources into just patrolling and law enforcement in the short term, which they keep saying they want to do, and they're waiting to see if they get a grant from the OHV division to do law enforcement, which I hope they do.

But also, just to be on the safe side, one of the neighboring landowners, a really good fellow named Jim Hennefer, who owns Paradise Valley Ranch--it's a several-thousand-acre private ranch right smack in the middle of the Knoxville public lands--and he's an antitrust attorney in San Francisco. He and I next week are going to go talk to Mike Pool, the new statewide director of BLM. I think the main thing we want to ask him to do is to provide more money that's not linked to OHVs, for managing Knoxville, and if he could come up with enough money for a ranger position out there, that would help a lot in the short term.

Swent: Ukiah is a long ways away.

Harrison: Yes, it is. And I heard that they even had thought of shutting down that office, and then the Knoxville and the other BLM lands in the area would be managed out of Susanville or something. But the reason that they didn't do that--again, this is just something someone told me once--is because of the OHV program, because that took off and became a big thing, and they needed more field offices to manage that. So unfortunately, they're really sort of hooked into this addiction to the OHV sport, and I think it has really been the antithesis of multiple use. It has really been a single use that has dominated this area. I don't think that's in the public's best interest.

Swent: It scares everything away.

Harrison: Yes, that's right. It scares other users away. They'll say sometimes, "Oh, nobody else is interested in Knoxville. Nobody would ever go there to go hiking or birdwatching. Nobody's interested in it except the OHV users." But I think that's another rationalization. That's the result of the way they've managed the place more than anything else. So I would really like to see that change.

It's a wonderful area. Despite the problems, it's still a very wild, beautiful area. Every time I go there, I see something new, and it's just an exciting place to explore, so I think there's hope for changing how it's going right now.

Swent: You reacted--when I said that it had been damaged so badly, you reacted pretty strongly because you feel that it had only been damaged by the roadside or near the roadside.

Harrison: Yes, because when I hear the BLM people say, "Oh, Knoxville. That place is trashed," what I think they're really doing is trying to rationalize the way they've treated it, because they wouldn't like to admit that it's a very environmentally special area and it has deteriorated under their management. They go around--it's an internal thing. It's not a deliberate lie. It's more of an internal rationalization: "Oh, that place. It's next to a mine. It's full of old roads. It's all shot up." And that's how they justify to themselves the fact that they treat it so poorly.

But I think that's got to change, and that's why I wrote this document, which is an attempt to just pull together all the information about how special Knoxville is. It's loaded with serpentine-endemic plants, about fifty species, which is as many as exist on any piece of public land anywhere. It's very diverse that way. A lot of scientists have worked there. I've got about thirty letters from various scientists and others to Rich Burns, the Ukiah area manager, basically saying what a great place it is and applauding his efforts to resolve some of the problems there, to try to demonstrate that there are people who do care about the place, who know about it and care about it, other than the jeep and guns contingent.

And these letters that are in here and some of the information that's in here were used by the lawyer who wrote the letter for Napa County, so I'm glad to see that the information has been put to good use in that effort.

Swent: It sounds as if you've marshaled a lot of supporters there.

Harrison: Well, it reminds me in a way of the effort that I got involved in a couple of years ago to put the reserve system back on its feet. It just seemed like here's a situation that so obviously is broken, but all the parts are lying around, and everybody agrees it should be fixed, and it's just a matter of getting enough support and getting people together and trying to fix it. It seems like something that was begging to be done.

Swent: And someone to do it.

##

Swent: You said someone with tenure and too much spare time--

Harrison: Yes, I deliberately said that when the tape was off, but that's okay. [laughter]

Swent: Oh. Well, tenure helps. It gives you the security to say those things.

Harrison: I never got the sense that, as an untenured faculty member, that I was under any certain kind of pressure to not say my opinions or anything like that, but I did notice that my attitude toward my job changed around tenure time because up until then, the emphasis was all, *Well, what can I do that will lead to some publication*? And now I feel like I have the luxury to ask myself, *Well, what do I really care about? What do I want to do that I would really find rewarding?* And that has changed a lot of things for me. So I do feel very lucky that this medieval institution, academia and tenure and sabbatical still exist, because I look at it as just an opportunity to--

Swent: Well, I was thinking also that when you're tenured you have more clout.

Harrison: I guess, yes.

Swent: The weight to do these things.

Harrison: But they put you on more committees, too. [laughs] The gloves come off. When you get tenure, they start asking you to do all kinds of stuff.

Various Studies at the Reserve: Not Just "Bugs and Bunnies"

Swent: You have certainly gotten involved in a wide array of things. One thing that we talked about at lunch which I don't think we have gotten on the tape were the number of classes, the variety of classes that you actually have using the reserve.

Harrison: Yes. If you look at, say, the classes that have used the reserve in the past two years, most of these have been from Davis. There's been a few from other universities, but from Davis we've had classes in, oh, wildlife biology, California plant communities, field methods in ecology, this program called Nature and Culture, which is for students that are looking at nature from both the humanities and sciences perspectives. What else? I would say altogether maybe a dozen different classes from Davis have used it, either for a day or for several days. The Nature and Culture class goes out there for a week and really studies the area. The whole point is to study a place from a lot of different perspectives, and that was really fun. I was involved in helping teach that this year.

And classes from San Francisco State and Berkeley and a few other places have gone there. Occasionally we get a geology class going there. I would like to see more of that. I would say at this point we have several dozen people doing research there, which is great. It's quite a few more than there were a couple of years ago. The place has started to pick up a lot of momentum. More and more people on campus are aware of it, so they get attracted to it as a place to work.

Swent: Are they there pretty much year round?

Harrison: No, it's very concentrated in spring. I mean, people are there at other times of year, but spring is when things really all happen. That's when the plants flower and the students go out there, and all of a sudden the place gets lively. In wintertime, of course, it's really hard to get around. You have to stay near the paved roads or risk getting stuck.

And I'm the only one crazy enough to work out there in the middle of summer.

Swent: How do you get there from Davis?

Harrison: There's two routes we mostly use. There's Highway 128. You go straight out west through Winters and then north and turn on Knoxville-Berryessa Road, which goes along the west shore of Berryessa, and then it keeps coming north after you pass the reservoir for about another fifteen miles, and it becomes a one-lane, very funky road. That's the scenic way. It takes almost two hours.

The other route, which takes the same amount of time although it's longer, is you go up Highway 5 and out Highway 20 and down 53 to Lower Lake and then go down on Morgan Valley Road to the reserve. That's easier if you're, say, driving a large truck or something like that.

There's also another route, which is very scenic and questionable, which is taking the Reiff-Rayhouse Road across the hills. That's the unpaved county road that goes over Cache Creek. It's a gorgeous drive and it actually doesn't take longer than the others, but it's only open in the dry season.

The county shuts the gates in the wet season so that people won't get stuck back there.

Swent: I've never taken that, and I've always wanted to.

Harrison: Oh, it's really spectacular. Last time I went over there I saw a roadrunner. I had never seen one until then. It was exciting.

Swent: Yes, that's one I would love to take sometime. Either it's closed or I don't dare.

Harrison: When people have seen bears and occasionally mountain lions, especially bears, most of the sightings are back in the Davis Creek reservoir area along the Reiff-Rayhouse Road. It's a good wildlife area.

Swent: Wonderful country. Now, you've mentioned this Nature and Culture class. It's multidisciplinary.

Harrison: Yes, the people that started it mostly are based in the humanities, and they're interested in nature writing, environmental literature, things like that. But it's also a major, not just a course. It's for students who are interested in nature but want to not specialize in either the humanities or the sciences. The science that the students do is mostly on the natural history end. They might take a plant identification class or maybe one geology class or something like that. I think the program still has a ways to go to really fulfill its ambition of making people multidisciplinary, because my experience co-teaching this class this year was that the students really aren't getting scientific thinking skills.

Things like the idea of testing a hypothesis or using numbers and statistics and experiments doesn't seem to be something that they've learned, so I think the science end of the program still needs some work. They're very enthusiastic and motivated students, but I think actually some of them are drawn to the major because they're a bit afraid of science. They're interested in the environment but they're a bit afraid of science, and that's one reason why they gravitate toward Nature and Culture. It makes a--less than it's supposed to be, but I think it just needs work.

Swent: But it's popular.

Harrison: Well, it's a modest sized program, but it has its enthusiastic followers. My sense is that there's more sincere enthusiasm for learning in those students than I see in some other majors.

They seem really interested, and they participate a lot in discussions. The major is almost like a little culture unto itself, and students tend to feel a sense of loyalty to it, which makes it a fun group of people to hang around with.

Sometimes I don't like to spoil the party by griping that they need to work harder to learn science, but I do think they need to.

Swent: Could you give a guess as to how many students a year are going out there?

Harrison: Well, it's hard to say. There's students going out there to do research and to take courses, and then we have a lot of field trips for various purposes, partly to advertise the place. Sometimes they're university-based field trips, and sometimes we've had trips for the Napa County Land Trust. Recently I led a trip out there for the Sierra Club, one of the Sierra Club chapters. So if you counted everybody, there must be over a hundred a year. But if you looked at one one of those categories, I'm not sure how many you would come up with.

Swent: And it's growing, you think.

Harrison: Yes, definitely growing, yes. This has all happened in the last couple of years. When Amy Wolf and I were working out there in '95-'96, it was pretty quiet.

Swent: Of course, that Berryessa Road isn't really--you can't go through there all times of year either, can you?

Harrison: You can now. About two years ago the county fixed the bridges, so they don't flood as badly as they used to, so I have used that road in the middle of winter. But that could change. If the culverts plug up, maybe we'll have to go back to taking the other route in wintertime. You can always get out by taking the other, Highway 5-Highway 20 route.

Overcoming Skepticism about Mining

Swent: Another thing that we talked a little bit about at lunch that I would like to get on the record was how some of your ideas have changed about mining since you got involved.

Harrison: I knew that you'd get to that question sooner or later! [laughter]

Swent: Or have they changed?

Harrison: Oh, definitely. I mentioned this a bit at lunchtime that my involvement in the place goes back to 1984-1985, when I was a new graduate student and went out there and sort of fell in love with the place, thanks to learning about serpentine and seeing all the interesting plants and butterflies out there at an impressionable time of life.

I was very unhappy to hear that a mine was going to come to this area. When we were approached by Ray and he began trying to sell this idea of making it a university reserve, I wasn't the only one who was pretty skeptical about this. People really wondered about it on a number of different levels, but one of them clearly was should we get involved in helping a mining company improve its environmental image? I mean, who knows whether this is a good thing or whether it's sort of a p.r. job or what. You know, we remained pretty skeptical for a long time.

After I left the area, went elsewhere for a few years and then came back to Davis as a faculty member, I think I sort of avoided going out there for a few years because I remembered what it was like before the mine was really visible, and I didn't really want to go back out there again and see it all changed, so during the early nineties that was one reason I never went out there--except on one trip, which is maybe another story.

But anyhow, when I did go back out and saw the overpass and the big buildings and the pipeline and the big plant, I wasn't exactly thrilled to see those changes. Even after I began--and still thought it was a wonderful place to do research. The plants are great, and the whole area around there is a great place to do research. I was still not completely converted to the cause of the UC and Homestake being partners.

And then I got involved, of course, in helping manage the reserve system, so at that point I guess I would have to say I had to buy into the idea, but it still took a while before--being out there and interacting with people--before my real underlying opinions began to change. I guess as much as anything else, partly it's just time. You get used to things.

But also I've been really impressed by the people at Homestake that I've interacted with--not just Ray but Dean [Enderlin] and Scott Moore, the surveyor, and Sarah Robertson and others whom I've met out there, and Pat Purtell. Just the sense that everyone there is really dedicated to their job, and there's this sense of professionalism and a sense of everything being on the up and up, I guess.

One thing I've noticed over the years is that I've talked to an awful lot of people that have come into contact with Homestake in one way or the other--whether it's the employees or the neighbors or the government regulators or the environmental groups that have been keeping an eye on what's going on out there--and I've virtually never heard anybody say anything bad about Homestake, and that seems pretty remarkable.

Swent: It does, indeed.

Harrison: Somebody did an amazingly good job of fulfilling everything that they promised to do, because naturally people like to complain and tell stories. In fact, I still haven't heard a bad story or any sense that they've done anything sleazy or cut any corners, which is, I think, pretty remarkable. So I think I've partly been converted by that.

Of course, any rational person has to look at something like a mine and feel like they are partly responsible for it. If they're a user of metals, then it's something we're all responsible for, not just the company that built the mine. So on that level--accept the idea that the mine is there and also maybe it's a good thing that they have tried to set a standard for how to do mines right--so in the end--it has taken a while, but now I'd say I'm pretty much of a convert to the point of view that Ray has been doggedly advocating all along: that mining is important and it's important to do it in a way that sets a better standard for mines in general.

Swent: I had forgotten that he and Bob Matthews were on the planning board together way, way, way back.

Harrison: Yes, back in the mid-eighties, I guess. I guess that must have been one of the--

Swent: A friendship that goes way back.

You were saying that there was another trip out there, but you said, "Oh, that's another story."

Harrison: Oh, it was just a little sideshow to this whole BLM story. Jim Cooper, this fellow who is the aggressive promoter of OHV recreation out there, wanted to build an OHV staging area on some Homestake land, and it was in fact the same place where people cut through the Homestake land to get to the BLM land,

and along the way they really damaged this very, very special wetland, small wetland area.

So Cooper's idea was to build a staging area on the county road and bring a road through this wetland to join up with the BLM land.

Swent: Oh!

Harrison: And so he proposed this. I'm reconstructing now. It has been a while. But I imagine what happened is he approached Homestake with this proposition, and Ray called upon people from campus to come out and give Cooper our collective opinion of this, and so since I was somebody with familiarity of the site, I was roped into going along on this little tour. We just all went out there and looked at this and shook our heads and said, "This is crazy." I guess the idea died then and there.

I think also on that trip, since we were out there anyway, Ray took us on a tour of the pit and so on. That was the first time I had really seen the place since everything was built.

Swent: Well, it's going to be a little lake eventually.

Harrison: Yes, that's right. It already is.

Swent: Or a pond or whatever.

So if this designation goes through that you want, the ACEC, that won't really affect your research efforts, will it?

Harrison: No, no, no. It's a sideline.

Swent: It will take them a little longer.

Harrison: It will make the reserve hopefully a safer place. It will make people more comfortable with going there to do research, either on the BLM land or next to it, on the Homestake land. I hope it will just be a better place for people in the region, that there will be another place people can go to go horseback riding or mountain biking or whatever else that they're not doing now because it's such a crazy, messed-up place. I think that whatever happens with the ACEC proposal, we'll certainly keep working with BLM to try to reach some kind of a good arrangement out there.

Swent: And what do these student research projects come to? What are you getting out of those?

Harrison: That's the point.

Swent: All right, what's the point?

Harrison: What do you mean?

Swent: Where are they going? Are they developing exciting results?

Harrison: Most of the projects out there are pretty new, so not a lot of them have produced papers yet. They're all still kind of getting off the ground. A number of people are doing plant evolution projects at this white seep site, have just started this past year, so no results yet. But I had a student named Jon Gelbard, who has just produced a paper after his first year of grad school, which is itself quite an accomplishment. He found some very interesting results. He's working in that whole region surrounding McLaughlin, and he's sampling the grassland community at different distances from roads. The ideas is that roads are the conduits for weeds, and all the processes that bring exotic, invasive species into a landscape pretty much start from roads.

And so we all have noticed, and you'll easily notice as you drive around, that roadsides tend to be weedy. We were interested in what takes place on a larger scale. So if you zoom back, do you find that once you get a long ways from roads you actually find fewer weeds and are those more isolated places refuges for native species, like the native bunch grasses, which are fairly heavily threatened by all these exotic, invading species?

And so Jon sampled ninety-some sites at 10, 100, and 1,000 meters from the nearest road. Half of his sites were on serpentine, and half were on non-serpentine grassland. And he sampled the species composition of the grassland community at all these sites and took soil samples and did all sorts of other things. What he found was that, sure enough, in non-serpentine grasslands, sites that are isolated from roads are both less weedy and are refuges for native species like bunch grasses.

So it really points to the importance of keeping areas roadless, because roads, for just a lot of different reasons, tend to increase the weediness of an area. Not only do the weeds themselves tend to come in on cars and cows and people's feet and things like that, but also roads bring in the disturbances that promote weeds--cow hoof prints and people's tracks and tire tracks--all those things increase weediness.

Since there's now such an awareness of how big a problem exotic species are in California, and everybody is trying to figure out ways to deal with controlling invasions, our results are one demonstration that at a pretty large scale, roads are one of the biggest factors that people ought to be thinking about.

On serpentine you don't see that nearly as much because serpentine is much less invaded. It has got more native species to begin with. I think there was still some effect of distance from roads, but it was a lot stronger in non-serpentine grasslands. So that was exciting, to see those results.

Swent: I was thinking, too, it's important to have a place where you can get a thousand meters from the road.

Harrison: Yes, that's right. It's no easy matter. In fact, he used GIS, geographic information system, technology to calculate what percentage of the landscape is that isolated. And even in that area, even if you take only that relatively rural area around the reserve, only about 10 percent of the landscape is 1,000 meters or more from a road. It's a pretty small area. And grasslands are less likely to be isolated from roads than other types of habitat because grasslands are where people want to go to graze cattle and do other things. And so to find an isolated grassland is not easy. Luckily, Jon is a very energetic guy. [laughs]

And some other students have done neat work as well. My student, Amy Wolf, finished her Ph.D. dissertation out there a couple of years ago. She was looking at serpentine-endemic morning glories and comparing their reproductive success when they live on small, isolated outcrops of serpentine versus when they live in the middle of large, continuous ones. She found really striking differences. Just like you might expect in a habitat that was fragmented by humans, she found that, sure enough, morning glories on small, isolated outcrops were less likely to reproduce successfully. They were probably getting more pollen from individuals that they're closely related to. Plants have self-incompatibility systems so that they won't inbreed--or many species do--and so the flowers would receive pollen but would be less likely to produce seeds because of the effect of being in these small, isolated habitats. That was kind of a neat project.

Not everybody out there is working on plant-y things, although most of us are. You've probably already heard there's a fellow named Darell Slotton who has worked out there for years on the mercury-related processes, mainly in Davis Creek reservoir, and there's a new student also in Charles Goldman's lab, Sudeep Chandra, and he's also working on mercury and some of the processes that transfer it from the mineral form to the biologically available form.

Swent: These are two people I have on my list to ask you about, Darell Slotton and Charles Goldman, whether you had worked with them. Goldman is a limnologist? Is that right?

Harrison: That's right, yes. He's a very eminent limnologist, and he has been really well recognized for his work at [Lake] Tahoe. He's "Dr. Tahoe." He has been working there for over forty years. He's over seventy now. It's really thanks to his work that we know that Tahoe is endangered by nutrient inputs, nitrogen and phosphorus inputs. He has worked really hard to make people aware of the importance of saving Tahoe and what needs to be done to protect it from nutrient enrichment. He just had a whole front-page write-up in the *Sacramento Bee* about his whole career. If you want some more material on him, it's all there.

And then Darell is one of Charles's students. About fifteen years ago, when the mine was getting going and there was all the controversy about mercury in the reservoir, Homestake approached Charles and I guess offered him a contract to do mercury studies there, and so it became Darell's Ph.D. project, and he has kept going on that ever since, although now he's working on mercury problems all over California. So unfortunately for those of us who are trying to bring greater glory to McLaughlin, Darell doesn't spend all his time there any more. He's working in about a million different places.

But Sudeep seems to be picking up the ball and doing more of his work at McLaughlin, which is great. One thing that Sudeep is involved in--and Darell as well--is looking at the effects of fire, because I guess the idea is that a lot of mercury from the smelter, from the old furnaces, could be sort of sitting around, kind of locked up in the soil and leaf litter and on the trunks of trees and things, and maybe the fire would liberate that and there would be a big pulse of mercury into the reservoir.

And so they've been tracking--Sudeep has been tracking what has happened in the wake of the fire and how much new input that might have led to. I haven't heard yet what has come out of that.

Swent: Interesting how much valuable research is coming out of all of this.

Harrison: Yes.

Swent: Thanks to your efforts.

Harrison: Not all thanks to mine, but I'm trying to help push it along here and there.

Swent: I think those are all the questions I had to ask, Susan. But did you have more that you wanted to say?

Harrison: Let me take a drink of water and think about it. Yes, here's the list you sent me.

Swent: You covered everything that I had mentioned, I think. That was just a very brief--

Harrison: Yes. Okay. [pause]

Swent: That isn't by any means all that we might talk about. Is there any other major topic that we--

Harrison: It seems like we covered just about everything, yes.

Swent: Does this directorship have a term, or does it rotate?

Harrison: Until I lose my sanity? [chuckles]

Swent: Can you continue with it?

Harrison: The director appointment was for three years, so that would end in 2002. I don't think there will be anyone vying with me for the position in 2002, so I'll probably do it for six years, and after that I'll just have to see what happens. Who knows what could be happening by then? I think in the best of all possible worlds, it should rotate about every five, six, eight years, something like that. But the trick will be to find somebody who's really enthusiastic, who for some crazy reason wants to spend half their time developing reserves. There may be others who are interested in picking that up, but it takes a little streak of altruism.

Swent: How much time does it take? Does it really take half your time?

Harrison: There have been periods of times when it has easily taken half my time or more, and then there are other periods of time where it isn't quite that time consuming. Having Shorty there now is great, and she really does a lot of the day-to-day mechanics of stuff that needs to be done. But what's amazing to me is how little of an impact that has made in my time budget. It has made some, but I think more than anything, there was just an amazing amount of backlog, sort of deferred maintenance, things that needed to be done, and so now we're doing all those things.

But I still put a lot of time into it. But I can't complain because I'm not the one who has to go out and fix the fences or do the really nitty-gritty work. I work more on the end of pester our administrators, make sure the money keeps flowing, think of ideas for where we could get money for the reserve. I just kind of maintain the whole web of political connections that we exist in. But as I say, it's fun. I wouldn't be doing it if it weren't fun.

It certainly has changed my outlook on a lot of things as far as what I'm interested in in my research and so on. When I think back to five years ago, before I got involved in it, I'm having a lot more fun now because I feel like it means more. That's nice.

Swent: That's what it's all about.

Harrison: That's right. Find your little patch of ground, and do what you can with it.

Swent: Patchy research. You've done a lot of research on patchiness.

Harrison: That's right, only patches.

Swent: You're also a good photographer if you took those pictures.

Harrison: Oh, thanks. I suppose my pictures of environmental damage at Knoxville aren't quite as attractive.

Swent: No, but they're good pictures [looks through some photos].

Harrison: When I was out there with the Nature and Culture class this September, we were driving out the Knoxville-Devil Head Road to go visit Jim Erasmy at his cabin. At that point, the *Napa Register* reporter had been telling me that the reason that she hadn't published the story on Knoxville was that the photographer just wasn't finding enough dramatic photos. So there I was, driving out there with the class, and we saw this bunch of people shooting. I stopped and said, "Excuse me. Do you mind if I take your picture?" And they said no. And so I snapped a bunch of photos of guys shooting, and they ended up using this one [indicates a photo] in the article.

Swent: That's certainly dramatic enough, yes.

Harrison: This guy later wrote a letter to the editor saying Knoxville should be left as a place where disaffected youth of Napa could go and have fun shooting. He called the reporter and had a nice chat with her. Apparently he was pretty friendly but then he wrote this critical letter--it's in here somewhere--just saying, "Hey, c'mon, Napa is a boring place to be a teenager, and at least at Knoxville we can go shoot and drive our trucks."

Swent: Oh, my. This was in the Sunday *Napa Valley Register* on November 26. The headline is "Where Worlds Collide: Guns, Miners, and Nature."

Harrison: You'll be disappointed. There's not a lot about miners.

Swent: No, no. That's okay.

Harrison: Actually, I heard Bill Wilder was a tad unhappy with this article because they used this photo, taken at his property, the place where he has his bone yard, and the photographer didn't seem to understand that that was not part of the Knoxville public land, so I think Bill felt unfairly dragged into this article.

Swent: That's too bad.

Harrison: It also refers to him as "Knoxville resident, Bill Wilder," which of course he's not, since nobody lives in Knoxville. It's kind of funny to think that this article has a dateline in a town that doesn't even exist anymore.

Transcribed by Mim Eisenberg
Final Typed by Shannon Page

Regional Oral History Office
The Bancroft Library

University of California
Berkeley, California

Western Mining in the Twentieth Century Series
Knoxville/McLaughlin Project

Raymond Krauss

ENVIRONMENTAL MANAGER, MCLAUGHLIN MINE

An Interview Conducted by
Eleanor Swent
in 1994-2001

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Since 1954 the Regional Oral History Office has been interviewing leading participants in or well-placed witnesses to major events in the development of Northern California, the West, and the Nation. Oral history is a method of collecting historical information through tape-recorded interviews between a narrator with firsthand knowledge of historically significant events and a well-informed interviewer, with the goal of preserving substantive additions to the historical record. The tape recording is transcribed, lightly edited for continuity and clarity, and reviewed by the interviewee. The corrected manuscript is indexed, bound with photographs and illustrative materials, and placed in The Bancroft Library at the University of California, Berkeley, and in other research collections for scholarly use. Because it is primary material, oral history is not intended to present the final, verified, or complete narrative of events. It is a spoken account, offered by the interviewee in response to questioning, and as such it is reflective, partisan, deeply involved, and irreplaceable.

****

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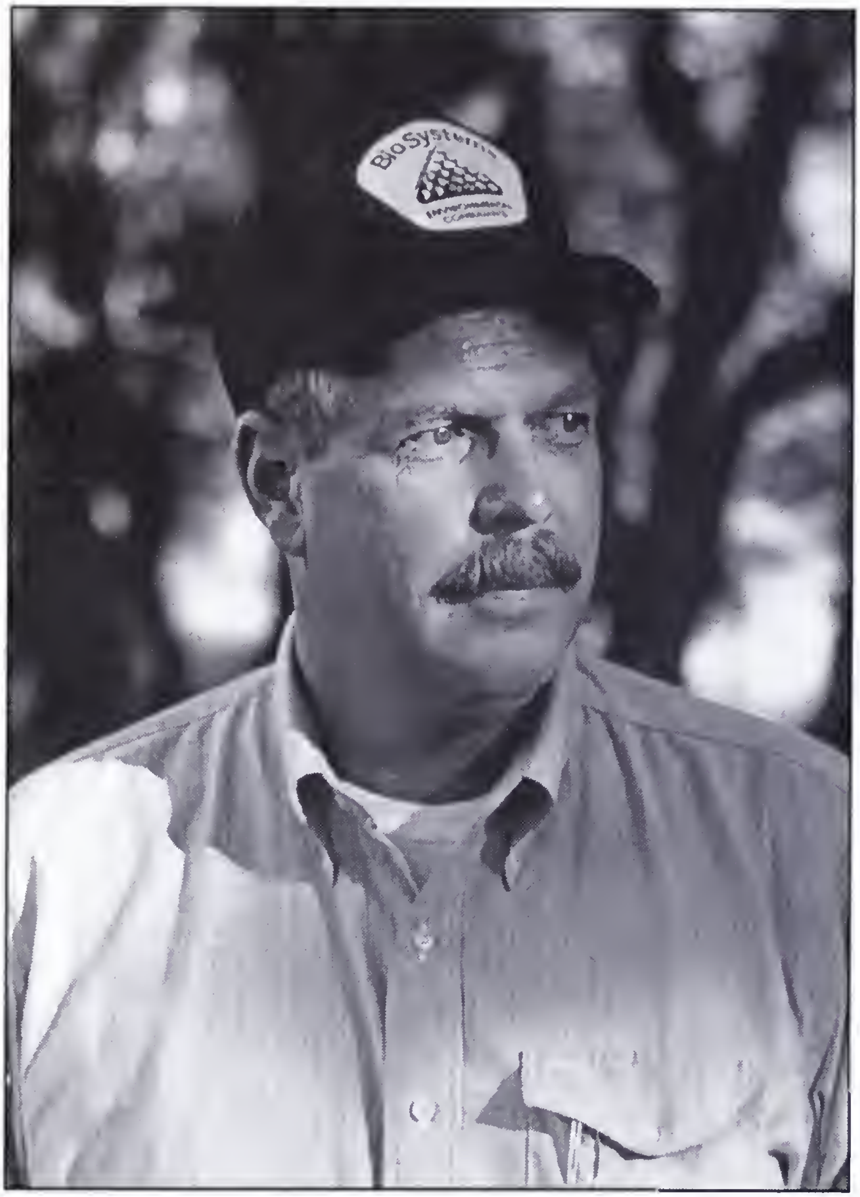

Raymond E. Krauss

Photo by Phil Hocker, 1993.

Raymond Krauss

Submitting application to Napa County for Use Permit to Mine and Reclamation Plan Approval, October 1982. L-R: Phil Crundle, James Hickey, Ray Krauss.

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INTRODUCTION by Robert Matthews

I first met Ray when we served on the State Mining and Geology Board in 1979. Also serving on this Board was James Anderson, Vice President-Exploration for Homestake Mining Co. I was very impressed with Ray, and we spent time discussing his involvement in environmental planning for Sonoma County. We also talked about his undergraduate studies in Environmental Planning at Oberlin College, an institution known for instilling in students the value of critical thinking. He continued his academic training in a graduate program where he ventured into interdisciplinary studies in Biology and Anthropology. We continued our discussions during the period when he was considering accepting a position as environmental manager with Homestake.

As an observer of Ray and with my background in Geology and Land Use Planning, I felt that Homestake made an excellent decision in hiring Ray. He had ten years experience as an environmental planner for Sonoma County, a county with considerable resource-related activities, rapid population growth, and many problems related to water availability, water pollution, and problems with solid waste and sewage, and he brought this vast experience to Homestake. Probably one of his most valuable qualifications was his experience and resourcefulness in dealing with state, local, and federal regulatory agencies. During his tenure with Sonoma County, Ray developed very workable techniques to deal with managing natural resources and methods to help resolve conflicts between resource developers, environmentalists, and government agencies. During our service on the Mining Board, I learned much from Ray as we dealt with advising on California's mineral resources and in structuring of methods to comply with the state's Mining and Reclamation Act. Ray played a most important role with the Mining Board. His broad experience in dealing with the resolution of resource problems was invaluable.

In 1980, James Anderson organized a field trip for the Mining Board and the State Geologist to visit the new Homestake gold prospect, the "One Shot" mercury mine. It was obvious to us all, but particularly to Ray, the numerous difficulties that had to be solved before this prospect could come on line. Ray's acceptance of the Homestake position, if my memory serves me right, was based to a great degree on how much responsibility/control he would have in developing the environmental planning-permit process and other critical functions that would get the process completed in a reasonable time frame.

I continued following Ray's involvement in the project. He was gracious enough to take valuable time from his duties to come to the university and discuss with students in my Environmental Geology and Land Use Planning class some of the problems and solutions to these problems he faced on a daily basis. He also led field trips on the property to introduce them to some of the activities occurring on the site. We continued these activities with other of my classes in Engineering Geology and Mineral Resources up until 1995 when I retired. Ray was involved with other academic institutions in similar activities.

These activities gave me an excellent opportunity to observe Ray's contributions to the Homestake McLaughlin Mine project. I strongly feel that it was very unlikely that Homestake could have found anyone with Ray's experience, competence, and dedication to get the project through the plethora of permits required in the short time frame that he was able to accomplish. Ray has always been very generous with time and sharing of his expertise and experience. He continues his involvement in activities in resource planning and environmental concerns. He has held leadership roles in resource-oriented organizations as well as environmental protection groups.

Early in his career with Homestake and the McLaughlin project, he had the foresight to see the potential opportunity for the project site as an area where the university could become involved in a cooperative venture to utilize some of the facilities, grounds, and equipment as a location for university-oriented research, as a field station for field-oriented studies and other academic activities at both the undergraduate and graduate levels. He was very instrumental in bringing about the very successful University of California McLaughlin Reserve.

I was very fortunate to have met Ray early in his career. I have greatly benefitted from his sharing his vast knowledge and experience and his willingness to contribute to Environmental Education. I am honored and pleased for the opportunity to participate in the introduction of a friend and colleague.

Robert Matthews, Professor of Geology, Emeritus
University of California at Davis

August 2001

INTERVIEW HISTORY--Raymond Krauss

The Knoxville District/McLaughlin Mine oral history project could not have developed as it did without the encouragement and help of Raymond Krauss, Homestake Mining Company's environmental manager for the mine. He sensed from the outset the social and historical importance of the mine and took seriously the responsibility to document its history and his role in it. Several of the key interviewees expressed doubt that the mine could have obtained the 327 necessary permits if it had not been for his expert work. In his interview, he traces his personal development from a county planner to an environmental manager and nationally acclaimed advisor to the Governor of California, the National Academy of Sciences, and the Bureau of Land Management, among others.

If ever there was a right person at the right time for a job, it was Ray Krauss. Again and again in the more than forty interviews of this project, his praises were sung:

Crouch: Ray just did a superb job
Goldstein: Ray took the laboring oar
Hickey: Ray Krauss has done a marvelous job.
Turney: Ray...taught us all some very important lessons
Wilcox: Krauss was the one that built the confidence....that gave us a sense of we're dealing with honest people here.

Even his opponents acknowledged his skills:

Baker: Krauss is a masterful PR person...they ran a very good campaign
Ceteras: Krauss was the right man....He always had the answer.

Ray and I consulted often on the oral history project, and he generously gave or lent files of newspaper reports, environmental reports, photographs, and videos documenting the development of the mine. He was always concerned for the breadth and comprehensiveness of the project. He supplied names and addresses of community and government representatives who were interviewed, and was scrupulous about not indicating whether they had been helpful or antagonistic. Much is made of the fact that the mine is located in three counties: Lake, Napa, and Yolo; Ray led me to the interview with Brice Bledsoe of the Solano Irrigation District, in a fourth county. He gave me leads for interviewees from the labor unions which tried to organize the McLaughlin Mine, and I talked with them by telephone, but unfortunately they would not consent to be interviewed.

Although I first cast Ray Krauss as the initial interviewee in the project, I later decided he should do the summary interview, as he has been the closest to the mine through its life. Some of the freshness of his recollections may have faded over the years, but the additional perspective is valuable. His own oral history parallels the history of the project itself. In 1991, when we began to plan the project, we said it would include thirty interviews and take four years. Ray came to the conference room of The Bancroft Library in Berkeley on 28 March 1994 for his first interview, covering his life up to the time when he went to work for Homestake. A second interview took place in the Homestake office at 650 California Street, San Francisco, on 18 December 1996. The third and fourth interviews were conducted on 25 and 26 October 2000 when I was the overnight guest of Ray and his wife Barbara Shumsky at their farm home on St. Helena Road in Santa Rosa. The final interview was conducted in the Strouse Press Room at The Bancroft Library on 11 July 2001. After ten years, the oral history project had grown to forty-seven interviews, mining at McLaughlin had ceased although processing of ore continued, reclamation was well advanced, and the community is now redirecting its energy. By 2001, Ray Krauss, in addition to all of his work for the mine, had served twice, totaling nearly a decade, as a member of the California Mining and Geology board, ended his second year as president of the California Mining Association, and is now often called to Washington for advice on national environmental issues.

It is fair to say that in the past twenty years Ray has been viewed at times with misgivings by both sides as environmentalists have struggled with the mining industry over changes in the General Mining Law and the implementation of the 3809 regulations. Some of the mining people saw him, as one said in his interview, as a “gung-ho, kill ‘em dead, anti-industrial type environmental person”; some in the environmental community felt he was a traitor to their cause for accepting pay from a mining company. In the end, he was able to satisfy nearly all the stakeholders that he took their interests seriously. He is influential in awakening industry to its environmental responsibilities, and he succeeded in obtaining permits for a major enterprise in an economically depressed area of northern California. In his final interview, he sums up his philosophy:

> I’ve always believed that as a society, we depend upon our resources, and the only issue was, how do we go about providing those social needs, those cultural needs, in a way that’s environmentally acceptable?

His personal friendship with Jack Thompson, first resident manager of the mine and later Homestake Chairman and CEO, was a factor in the successful development of the McLaughlin Mine. Working well together, they devised technical plans to satisfy environmental as well as economic requirements; they also built sound human relationships with the affected communities. Ray's proactive environmental policy, which was innovative, even revolutionary, twenty years ago, has been emulated by other mining companies and now is standard procedure not only here but in most overseas mining enterprises. He is comfortable with both academic/scientific thought and the pragmatic business realm, and can articulate varied points of view to reach consensus. He can demonstrate that it makes sound long-term business sense to plan reclamation along with development, and to consider the needs of regulators before they become antagonists.

Born in Ohio in 1942, the son of a university professor, Ray exemplifies a generation who came to San Francisco in the sixties from liberal Midwestern campuses such as Oberlin, and in time found productive work which satisfied their idealism. His home is reached by a winding road up the mountain from Santa Rosa; in late October it is especially beautiful with fall colors on trees and vines. The house, which he and Barbara largely built themselves, overlooks their orchards and gardens; the ambiance is rural and also sophisticated, with hundreds of books, fine music, and works of art. Barbara is active in farmers market and organic farming organizations in Marin and Sonoma Counties; she is up and about before dawn most days, rain or shine. Her Mexican helpers work diligently and with evident enjoyment even when she is not there. We interviewed in the adjacent two-story office-guest house, which is completely plugged into the high-tech information age. Chardonnay and Cabernet, large friendly dogs, joined us and occasionally punctuated the interview with barks.

Shortly before the final shutdown, Ray came to the office on Morgan Valley Road on Saturday, 9 March 2002. We captured on video his discussion of environmental protection, reclamation, monitoring, and stewardship at the McLaughlin Mine. As he talked, he pointed out features on the topographic model of the 10,000-acre area with its two watersheds. This video, which also includes Patrick Purtell's explanation of the processing plant model, will be preserved at The Bancroft Library and also at UC-Davis.

The tapes of the Raymond Krauss interviews were transcribed by the Regional Oral History Office, lightly edited, and sent to him for review. He made several minor clarifications of diction and returned the transcript promptly. The manuscript was corrected and indexed at our office. The tapes are deposited in The Bancroft Library and are available for study.

The Raymond Krauss interview is one of forty-seven interviews which were conducted by the Regional Oral History Office from 1993-2001 in order to document the development of the McLaughlin gold mine in the Knoxville District of Lake, Napa, and Yolo Counties, California, from 1978-2001, as part of the ongoing oral history series devoted to Western Mining in the Twentieth Century. The Regional Oral History Office was established in 1954 to record the lives of persons who have contributed significantly to the history of California and the West. The office is under the direction of Richard Cándida Smith and the administrative direction of Charles B. Faulhaber, The James D. Hart Director of The Bancroft Library, University of California, Berkeley.

Eleanor Swent
Project Director, Research Interviewer/Editor

May 2002
Regional Oral History Office
The Bancroft Library
University of California, Berkeley

Regional Oral History Office
Room 486 The Bancroft Library

University of California
Berkeley, California 94720

BIOGRAPHICAL INFORMATION

(Please write clearly. Use black ink.)

Your full name: Raymond Edward Krauss

Date of birth: September 9, 1942 Birthplace: Athens, Ohio

Father's full name: Paul Gerhardt Krauss

Occupation: Professor of German Birthplace: Riga, Michigan

Mother's full name: Mildred Converse Krauss

Occupation: High School English Teacher Birthplace: Grand Forks, North Dakota

Your spouse/partner: Barbara Shumsky

Occupation: Organic Farmer Birthplace: Brooklyn, New York

Your children: None

Where did you grow up? Athens, Ohio

Present community: Santa Rosa, California

Education: B.A. Biology, 1964, Oberlin College; M.A. Biology, 1966, University of Michigan.

Occupation(s): Resource Management Consultant, 1998 to present, providing services to Homestake Mining Company, other major mining clients, agricultural interests and conservation organizations.

Areas of expertise: Application of pollution prevention strategies to the disposal of waste rock and tailings, the prevention of acid rock drainage, the management of storm water runoff, the control of air emissions, the reclamation and closure of mined lands and the stewardship and restoration of natural habitats. Communicating technical issues to non-technical audiences and facilitating productive, respectful relationships between industry and members of the environmental community.

Other interests or activities: Photography

Organizations in which you are active: National Mining Association, California Mining Association, Northwest Mining Association, Mining and Metallurgical Society of America, Blue Ridge Berryessa Natural Area Conservation Partnership.

SIGNATURE: R Krauss DATE: 1 Oct 01

INTERVIEW WITH RAYMOND KRAUSS

I EARLY YEARS, 1942-1970

[Interview 1: March 28, 1994] ##[1]

Youthful Awareness of Environmental Problems in Appalachia

Swent: All right, Ray, we're beginning to interview you on your involvement at the McLaughlin Mine, but I think we need to go back with where you started and how you got to there. Can you tell me where and when you were born?

Krauss: I was born in Athens, Ohio, in September of 1942.

Swent: This is a small town?

Krauss: Athens is a small town in the foothills of the Appalachians. It's a little university town, Ohio University. It was the first university in the Northwest Territory, and my father was on the faculty at the university.

Swent: What did he teach?

Krauss: He taught German, German grammar and German literature. I went through grammar school and high school there in Athens. Probably my first exposure to mining were the abandoned coal mines of Appalachia, and the old slag heaps and the acid creeks and the unreclaimed disturbed areas that were prominent throughout the hillsides in Athens County and surrounding counties.

Swent: That was an important childhood influence.

Krauss: Well, in retrospect, yes, I think so. When I was in the third grade, I remember I spearheaded a project to build a model of an underground shaft mine. Took a table and drilled a hole in it, and built levels, and made stick figures out of pipe cleaners and little cars hauling coal around. So it was enough to have attracted some interest, now that I look back on it.

---

[1] ## This symbol indicates that a tape or tape segment has begun or ended. A guide to the tapes follows the transcript.

Swent: Were these considered dangers at that point? Was the water dangerous, for instance, to drink?

Krauss: It was part of the landscape. I don't think people paid much attention to it. There was, just in my high school years before I went off to college, there was beginning to be an awareness, in the late fifties, early sixties, that it was an environmental problem. The lake, Lake Hope, that we used to go to and have picnics and swim in, was progressively becoming acidic, and it no longer had fish that could be caught. I think in subsequent years, there were efforts to bring limestone into the creeks and neutralize the acid, and remediate the problems. But certainly in my early childhood, there wasn't that awareness.

Swent: There was a lot of talk then about Lake Erie dying, wasn't there?

Krauss: Yes. That again, though, was late fifties, early sixties.

Swent: Later. Then, of course, you were not there by that lake.

Krauss: Well, I went to college at Oberlin, which was near Cleveland, which is near the lake.

Oberlin College, 1960-1964

Swent: When were you at Oberlin?

Krauss: From 1960 to 1964.

Swent: What did you major in?

Krauss: Biology.

Swent: When was [the anti-war incident at] Kent State?

Krauss: That was in the seventies; that would have been '72, '73. I was already in California then.

Swent: Oberlin is a marvelous college. It has always been at the front of things, hasn't it?

Krauss: Well, it has a tradition of being socially aware. It was one of the first universities to be coeducational, to provide educational opportunities for women, and it was one of the first colleges to admit blacks. It was an important way station, I guess, on the Underground Railroad during the Civil War. And I think that tradition prevails in that they encourage people to look at--to challenge the social norms, and to explore alternatives to the way things are.

Swent: So you obviously got a good education there.

Krauss: I was lucky, yes. And it was a multidisciplinary education. There was a great deal of emphasis not on specializing but rather on expanding your education and integrating among the disciplines. As I've looked back over the years, I've used all of them. The political science and the sociology and the psychology has been every bit as important to me working for Homestake as the biology and chemistry and physics and geology. So it's all part of the big picture.

Swent: And your writing skills, speaking skills, certainly help you.

Krauss: Yes. Learning--well, my mother was an English teacher. [laughter] I had no choice. But yes, certainly--and I've reflected on that as well, the insistence upon communication skills at Oberlin. I had a teacher that, the first paper I turned in he said, "You have an A mind and you write a C paper. What a waste." And that was a real challenge. He said, "You're not working up to your potential. You can either be lazy and coast, or you can work up to your potential." It was done in such a way, a gentle, encouraging way, that it did challenge me to try to meet his standard.

Swent: Were you a good student?

Krauss: It was a difficult thing for me initially. I was a mediocre student the first two years. I came from a very small high school and was competing with kids from top-notch high schools all over the country. So I had mostly B's and C's the first two years, and then by my junior year, something clicked. I began to understand how everything fit together, and I had mostly B's and A's in my last two years. But I started with a deficit, compared to many of the other students there, no doubt about it. They had already had calculus, they had already had a lot of the science that I was learning for the first time. So it was tough; I was playing catch-up.

Swent: A tough college, too. Did you have any clear idea of where you were going when you graduated?

Krauss: Not really, no. My initial inclination was pre-med, started in--. And so I took a heavy load of science. And by my senior year, I had thought that I preferred ecology and being outdoors, and natural sciences, to finding myself locked in a hospital the rest of my life. So I refocused on biology.

Swent: Ecology was a word that just came into our vocabulary about that time, didn't it?

Krauss: Yes, it was--George Odom had written his textbook on general ecology. There was a professor at Oberlin by the name of Kormondy who taught a really wonderful introductory ecology course, which was really looking at the processes of the natural systems, how do all of these things fit together and interact--what makes the world go round, I guess, in the detailed sense.

Swent: Was he the most influential professor that you had?

Krauss: In biology. There were certainly others in other departments that were influential.

Swent: Would you like to mention them?

Krauss: Boy, I'd have to go back into my memory bank. But it was Dewey Ganzell who was the English prof who promoted my communication skills. There was a sociologist by the name of Milton Yinger--

Swent: Oh, the famous Yinger family.

Krauss: Yes.

Swent: I know some of them. Paul Yinger was a dear friend of mine.

Krauss: Oh, really? Well, he [Milton Yinger] had just so much immense curiosity. He was always prompting us to say why, to look at human interaction and human patterns and human activities, "Why do you suppose it is that way?" That kind of thing sticks with you.

There was a Taylor in humanities who taught a humanities course in which he was integrating art history and music history and literature and human philosophy historically, which was kind of mind-expanding. But those would be the ones that stick in my mind, thirty years after the fact.

Swent: It is thirty years, isn't it? So then you went to Michigan?

Graduate School, Biology and Anthropology, University of Michigan

Krauss: Went to the University of Michigan for graduate school, also in biology. That was a real struggle for me. Then I was doing all of the prerequisites to a Ph.D., and it was--I remember a terrible embryology course where I had to spend hours and hours in a laboratory looking at chick embryos and memorizing each piece and its Latin name.

My minor at the time was in anthropology. I was majoring in biology, and I loved the anthropology, basically because the anthropologists were the only people then talking about the relationship of human populations to the natural environment. They were always asking the question, Well, what kind of environment would foster human civilization? Where do we go look? And how did they live, and what was their economy, and how did they relate to their food source and their housing? And that was, in my mind, at least one of the elements of the birth of environmental science and environmental engineering. I had a professor by the name of Marston Bates who--

Swent: The big name.

Krauss: Yes, the Marston Bates. He was very, very tolerant. I was just kind of a loose-ends kid trying to figure out what I wanted to do. I felt drawn to him, and I'd stop by his office, and he'd talk for hours. He was a very, very tolerant, accepting person, and very encouraging of my interests and curiosities.

Swent: Are you still in touch with him?

Krauss: No, I haven't been.

Swent: I think he'd be very pleased with what you've done, wouldn't he?

Krauss: I would like to think so, yes.

There were others, too. There was Francis Evans, who was an ecologist, field ecologist. A very rigorous, technically correct field ecologist, but he was also very tolerant of looking at things in different ways and encouraged me to--I did some readings under him in population ecology and territoriality in bird behavior. Again, what creates the distribution of living things on the landscape, and what are those interactions between the physical landscape and the living landscape. I think he was helpful to me.

The other name that comes to mind from Oberlin was Aaron Wildowski, who was teaching political science there. I think he's subsequently been here at Berkeley, and I see his name in the literature now and then; he has since gone back to Chicago--I'm not sure where he is. But he was always talking about social decision making, the political process by which societies change and develop and rule, and what are the sources of power and what are the consequences of power.

But, yes, I was tremendously fortunate. I had some really wonderful people back there in the sixties, to kick me around mentally.

Swent: Wonderful education.

Krauss: Yes, I was lucky.

Swent: Your parents were pleased?

Krauss: Mixed reaction. My parents had awfully firm expectations that I would be a doctor or a lawyer or a professor, and they were impatient with my lack of focus, I guess. I was still kind of floundering around, trying to figure out what it was I wanted to do. I dropped out of the Ph.D. program. I completed a master's degree.

Larry Slobotkin in the ecology department, I had asked him if he would be my major professor, also an ecologist. He said, "Sure," and he wanted me to study the population dynamics of daphnea and planaria or hydra or something in his refrigerator. I could just see spending the next three or four years of my life studying the population dynamics of these critters in his refrigerator; didn't get me excited at all. And by that time, I was old enough to be free of the threat of being drafted, which was always in the back of our minds then, so I took a job teaching.

I applied for the Peace Corps and was accepted. I wanted to go to Nepal, and they said, "You can go to the Philippines."

I said, "No, thanks, if I can't go to Nepal, it's all or nothing." So I took a job teaching in Baltimore, Maryland, at Towson State College.

Teaching Biology, Towson State College, Maryland

Swent: Teaching biology?

Krauss: Teaching biology, yes. That was a wonderful experience, because that was really the first time I had lived in an urban setting. I lived in Baltimore, and experienced the ethnic communities. That was also a growing exercise, living in a city and going to the museums and libraries and concerts.

Swent: Ann Arbor seemed like a city to me, but maybe it wasn't when you were a student.

Krauss: Well, yes. When you're on campus, you're so focused on your studies. And certainly a port city like Baltimore, Maryland, was a much bigger city. Ann Arbor is such a specialized community with regard to its campus and the associated activity.

In '66 I left Ann Arbor, so the academic year '66-'67 I was in Baltimore. Then I came back to the Ann Arbor area and taught at Wayne State University for a year.

In the middle of the winter of '68, I got terribly cold and fed up, and fell in love, and all at once I quit my job and got married and moved to Puerto Rico, all within three months, I think.

Puerto Rico and Bill Haddad, 1968-1970, Planning in a Small Political System

Swent: Was your wife Puerto Rican?

Krauss: No. But she had spent time in Puerto Rico. She had first gone there as an exchange student in high school, and had friends there. I ended up finding a job there working with a man by the name of Bill Haddad, who had been part of the John Kennedy brain trust. He was the assistant director of the Peace Corps when it was first founded, and he had been the inspector general of the OEO. He was an old newspaper hound.

Swent: The OEO is the Office of Economic Opportunity?

Krauss: Yes. He was with the old *New York Herald-Tribune*. He worked as an aide for the Kefauver committee when they were investigating drug cartels, and he wrote stories on--he was an investigative reporter. He got into politics and worked for the Kennedys. He was involved in running Bobby Kennedy's campaign when he was assassinated in Los Angeles. He and a lot of his staff, he had formed a company called U.S. Research and Development or something like that, and he ran manpower training programs and governmental consulting programs, very diverse set of activities. But he had run the campaign for Governor [Luis Alberto] Ferré in San Juan. He was the first non-Populare--first Republican, basically--governor of Puerto Rico since Muñoz.

But anyway, he had a bunch of government contracts in Puerto Rico, and he put me to work in their planning agency doing transportation studies and economic studies and resource studies. That was an interesting experience, too, because as an island, it's a small enough system that it's kind of an experimental system. You could see all of the political decisions and why they were made and who benefitted, and who influenced them.

Swent: And bureaucracy. This was your first dealings with bureaucracy, I guess, wasn't it?

Krauss: Yes, it was that. It was funny. They were so uniform in their performance. They all wore dark suits and white shirts. After about three months, I started wearing a blue shirt, and people would look at me very strangely. After about nine months, probably 20 percent of the people in the building began wearing colored shirts. I figured that--

Swent: Oh, really? You loosened them up.

Krauss: It was a sociological experiment; it was kind of interesting to see whether or not they'd respond.

But that expanded my interest into the relationship of this environmental science to the political, how the decisions are made and how the money flows, and who wins and who loses and why. So I think that was probably an important part of my experience, too.

II WORKING IN THE BAY AREA, 1970-1981

Urban Planning in San Francisco for Ecos

Krauss: And then I left there and came to San Francisco. I was transferred by Bill to San Francisco to run a job program he had in Antioch. I spent about six months doing that.

Swent: Antioch, California.

Krauss: Antioch, California, yes. And couldn't stand it. Purely administrative work. Then I lived in San Francisco for a while, where I met my present wife. I worked with a group of people in urban planning.

Swent: Your first wife died, didn't she?

Krauss: Yes. And then I got my job in Sonoma County as an environmental planner.

Swent: So you were working in San Francisco in urban planning, for the city?

Krauss: No, it was a private group called Ecos. It was a group of people that had found some foundation funding. There was a lot of interest at that point in trying to develop new ways of empowering people to control their own lives, and deal with their own housing and their own employment and their own training, and the Stern Foundation and others put some seed money into these efforts. The idea was that the model of the old housing project wasn't working. They were warehousing all of these people in these public housing projects, and they weren't working well, and there ought to be some better model. So this was a group of architects and planners who were talking about taking old urban structures and converting them to housing, and creating living environments where people could work and live in the same place.

Swent: Twenty years later, not much has happened.

Krauss: No, it was pretty idealistic even then.

Swent: Sounds good. What were you doing with them?

Krauss: I was doing grant proposals and also community organizing, little of both, both ends of it. Went off to the Ford Foundation and tried to shake their money tree. But it was mostly sitting around talking and dreaming about how we'd make a better world, I think. That was the bulk of the focus.

And then I decided that that was kind of a dead end--

Sonoma County Planning Department, 1971-1981

Swent: So this was about 1970?

Krauss: That was 1970, '71. And then in the fall of '71, November or December of '71, I gave up and said it wasn't going to go anywhere, and I picked up the paper looking for a job, and found an ad for the Sonoma County Planning Department. I had the feeling at the time when I first read the ad that it was going to work.

Swent: What was Barbara doing?

Krauss: She was working for a public opinion survey company, Public Response Company, doing public opinion testing, polling for political campaigns mostly, devising the questionnaires and collaring the people and tabulating the results. But the ad for Sonoma County caught my attention, and I applied and sent in a resume, and went through the civil service hiring procedure where they have an interview committee of other people practicing in that profession from other jurisdictions. I made it through the interview, and I made it to the top three. I guess there were 250 applicants for that job. It was incredible.

When I went in for the interview with the planning director, his first comment was, "Well, you know you're not qualified for this job." [laughter]

I said, "Not qualified? Well, if you just brought me up here for your amusement here, I've driven all the way from San Francisco for this interview because I'm taking it seriously, and I'm angry at you, and I'm not going to put up with this."

He laughed, and he said, "Well, I've got this problem. I've got all these people pounding on my desk saying that we're not paying attention to the environment. I've got this new law called the Environmental Quality Act that requires us to do environmental impact studies on all our major projects, and nobody knows what an environmental impact report is. I need somebody on my staff I can call an environmentalist. When I looked at your resume with ecology and biology, it looked like I might call you an environmentalist."

We talked for about an hour and a half, and at the end of the interview, he said, "Well, I think you have a future with Sonoma County."

Swent: Why had he thought you were not qualified?

Krauss: Because I didn't have an urban planning background. I didn't have a degree in planning, I didn't have the traditional requirements that they would have considered appropriate for an assistant planner position in the civil service.

Swent: But in fact, you had what they needed.

Krauss: I guess so. I spent almost ten years, eight and a half, nine years there, from 1971 to 1981. I lose track--it may have been November '72 through '81, when I joined Homestake.

Swent: So you moved up then to Sonoma?

Krauss: Moved to Santa Rosa. Started out just as a junior planner doing routine use permits and subdivisions and planning permits.

Swent: Was Santa Rosa really exploding then?

Krauss: It was beginning to. Petaluma was really, the wave of urban commuting had gotten as far as Petaluma but not as far as Santa Rosa yet. So Petaluma was exploding, and Rohnert Park was exploding. Santa Rosa toward the end of that period began to take off. But it's an interesting county in that there are a lot of--it's a diverse ecology and a lot of resource projects, timber and agriculture and geothermal steam and gravel mining. Those were the kinds of projects that no one else on staff wanted to pay any attention to.

Swent: When did the Geysers--was that when the Geysers were being developed?

Krauss: Yes, the Geysers development began, I think the first well was drilled in the early sixties, but when I started, they were building plants number four and five and six and seven. So it hadn't gone very far. There are twenty or thirty plants up there now. And no one else on staff wanted to do the permits for those things. It was too far to drive, and you got home late, and it was terribly controversial. Every time you had a permit for gravel mining, you'd have 100 people in the audience shaking their fists at each other and yelling.

I just naturally gravitated towards those issues, so I said, "Sure, I'll be happy to take care of those." I really learned a lot about resource management through that experience. And the other work I had to do was supervise the preparation of contracted environmental impact reports for all the major projects. So I learned to know the process of managing consultants.

Swent: That is, somebody would come in who needed an environmentalist to do, or to present an environmental impact report, EIR? You supervised--?

Krauss: Actually, the county prepared them at the cost of the applicant. So the applicant would come in and say, "I want to build this subdivision," and the county would review it and say, "This project may have a significant adverse effect, and therefore it requires an EIR, and we'll go out and get bids to prepare an EIR, and then you deposit with the county the money to do it, and we'll prepare it and take it to public hearing."

Swent: So you actually did the EIR for them?

Krauss: I managed the consultants. Made sure that the scope of work was appropriate, and addressed all the right issues, and that the methodologies employed were technically sound, and the conclusions were defendable, and that the mitigations were workable, and ultimately, that it could survive public scrutiny. That was the acid test: can you throw it out to the public? And you have a very sophisticated public. You've got a lot of scientists and professors and engineers who have different points of view about the merits of the project that are going to take a good hard look at it.

Swent: In Sonoma County at that time, you did have?

Krauss: Oh, yes. We had the professors at Rohnert Park who were involved in the environmental community.

I had the good fortune, I worked with a man by the name of Tom Cordill, who really was my mentor in developing--he was the one that helped me integrate all this diverse background into some coherent focus. He had been doing the same all his life. He had been wondering why in the world the world worked the way it did. He even, at the age of fifty, quit his job. He was the zoning administrator for Marin County, and he quit his job and went back to college at Oregon and did a degree in sociology, because he thought the only way he could figure out how things worked was to understand how people interacted. So he had that kind of inquisitive mind, and he was very patient with me.

Swent: He was now at Sonoma?

Krauss: Yes, he was at the Sonoma County Planning Department. He was my immediate boss. He called himself the environmental impact administrator. I had an artist friend of mine one day draw a picture of him with a lightning bolt in his hand, administering environmental impacts. [laughter] But he was very helpful to me, and encouraged me to understand the nature of resources and the way that society thinks about resources and how they're developed, and what the obstacles to their development are.

Gravel Mining in the Russian River

Krauss: It was working with him that really, my interest in mining revived, because one of the most controversial issues in the county was the mining of gravel from the Russian River.

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Swent: Gravel mining is always a public relations hassle, isn't it?

Krauss: Yes. Well, a river is a very complicated system, and it has a lot of resource functions. It's a water supply and provides flood control and recreation and fishery and riparian habitat, as well as a source of aggregate. Each of those resources has its own constituency, and each of them feels that the river ought to be managed for their interest to the exclusion of all others. So it's a classic resource management issue.

Swent: What was this aggregate used for? Highways?

Krauss: The Golden Gate Bridge, Highway 101, Hamilton Air Force Base, all of the development in Sonoma County. There were 40-some-million tons of sand and gravel taken from the Russian River from the 1930s to the 1960s. All of the major construction in the north Bay was--

Swent: It's used for concrete and also for roads?

Krauss: For concrete, road base in concrete, and asphalt.

Swent: Buildings as well?

Krauss: Sure. Foundations for building. Everything is--each individual in society uses ten or twenty tons of gravel per year, on an average annual basis. It's a big number.

Swent: That's a huge number. And no one ever wants it dug where they can see it.

Krauss: No, but everybody's quick to complain when there's a pothole in their road. So yes, the contradictions that people live with.

Swent: Most of us are so unaware of how much gravel we need.

Krauss: Yes. But really, the Farm Bureau came to me initially and said, "You've got to stop these gravel miners from destroying our vineyards. They're overmining the river to the extent that the channel is downgrading, and it's undermining the banks, and our farmland is collapsing into the river. They're digging these big holes and it's creating--" what they call head-cutting. The hole would fill in from gravel recruited from upstream, and that would undermine their vineyards. They took me out and they showed me where they had done miles of rip-rapping.

In Dry Creek Valley, there was one farmer who had, in the 1950s, early sixties, had built his river bank out of car bodies. He had chained together thousands of car bodies over a distance of several miles and filled them full of rocks, and planted willows in them, trying to protect his land from washing downstream.

Swent: The gravel miners were going right into the river bed?

Krauss: Yes. They mined the channel with a drag line for a distance of fifteen miles to a depth of eighty feet. So yes, it was a dramatic change in the hydrology of that system, there was no doubt about it. And Dry Creek, which enters into the Russian River at Healdsburg, had expanded from a stream three feet deep and thirty feet wide to a stream thirty feet deep and 300 feet wide. It was a dramatic impact on the landscape.

Swent: And rich farmland.

Krauss: Sure, that somebody owned, that somebody had a direct interest in.

Developing and Implementing the Sonoma County Aggregate Resources Management Plan

Swent: Were the groups organized?

Krauss: Yes, there was litigation. The Farm Bureau had actually gone to court to try and stop it. And of course, our approach to it from a planning department standpoint--we never saw the total picture. All we saw were individual permits, so we'd get a gravel operator that would come in and say, "I'd like a permit to mine one season's worth of gravel from this stretch of the Russian River." We were required to do an environmental analysis of this. The first conclusion you come to is that you can't analyze this project without looking at the total system. You can't look at this in isolation.

So I developed a proposal to do a system-wide environmental analysis of the Russian River, to do a county-wide, what we called an aggregate resources management plan, and look at all of the demand for sand and gravel for aggregate, and look at the potential supply, and look at the range of environmental consequences depending upon the different sources of supply, and to come up with some sort of a balance that would assure a continued supply at the same time that it protected the environment.

I put together a proposal to do this study and took it to the board of supervisors, and they agreed it was an appropriate thing to do. We got a group of consultants--we did the whole study for $80,000. Subsequently, other counties have attempted to do similar things for many, many times that. Yolo County has spent over $1 million trying to do the same thing on Cache Creek, and they still don't have a solution.

But we put together what was a reasonable system. We concluded that--

Swent: You hired consultants?

Krauss: We did most of the work internally. I had some students, I was teaching at Sonoma State part-time at the time, and I dragged my students up and put them to work. We hired a few--we hired a geologist to look at the alternative sources of aggregate in the county, and we hired a biologist to look at the riparian vegetation on the Russian River. But the bulk of the work was done by a group of students who constructed the plan.

Swent: And you were limited just to the county?

Krauss: Yes. Well, in Sonoma County's case, that's pretty much what you'd call a production-consumption region. Some of the material went south to Marin County, but it was pretty much a complete system; we were lucky. A little bit of mining in Mendocino County on the upper reaches of the Russian River, but not enough to really influence the outcome of the study. So it was a fairly complete system; it worked pretty well.

But we made everybody angry. [laughs] We created these wonderful role reversals. The conclusion of the plan was ultimately that this river system had in fact been overmined, it had been extracted to the point where it was creating adverse consequences that were beyond what was acceptable. And that damage to a river system was the most costly to repair; it was the most dynamic system to work in. If you made a mistake in a river system, the consequences were substantial, and that the mining in the river ought to be restricted to the amount of gravel that is replenished on an annual basis.

Very much the same work that Luna Leopold does now. Actually, I read a bunch of his stuff at the time, and he reaches the same kind of conclusion. There's a natural balance to the river, and if you work within the limits of that natural balance, you can extract some material without upsetting the hydrological equilibrium. If you exceed that, then you've got a problem.

The next alternative was the mining of the river terraces, the accumulated alluvial material along the river, and those were, I guess, one degree of complexity less complicated. They weren't subject to the flowing water, but if they were mismanaged, they had the threat of becoming part of the river system, of the river diverting its flow into the pit and creating a lot of erosion. And they were overlain by prime soils, so there was a tremendous conflict between these lovely prime agricultural soils and their loss, and the mining of aggregate.

The third alternative would be quarries in the hillsides, where you don't have prime soils, and you don't have complicated water relationships. You don't have rivers flowing through them, but you have a high level of visual impact, because everybody can see them.

Swent: "Mountain scarring."

Krauss: So basically, we concluded that there needed to be a shift from the rivers into the terraces and into the quarries, and ultimately predominantly into the quarries, because you didn't want to sacrifice all the vineyards in Sonoma County to produce aggregate. And the environmental community came out and said, "Yes, we think we ought to have more mines in the hills and fewer mines in the river."

The mining community came out and they did these wonderful slide shows showing all of the ugly scars on the hillsides, and they said, "No, we're opposed to mining in the hillsides, because we want to preserve the status quo." So it was an absolute role reversal. The environmental community supported mining, and the mining community opposed it. And they had 2,000 people show up at the first hearing. They had to adjourn the hearing and reconvene it at the Veteran's Auditorium. It was a terribly controversial issue.

Swent: When was this?

Krauss: This was I guess '78, '79, and '80, those years.

Swent: Why would it matter that much to the mining people? Just the expense of moving their operation from the river?

Krauss: Yes, the threat of losing their in-place investment. They owned the land, they had the equipment in place.

Swent: Oh, they did own the river?

Krauss: Yes, they either owned or leased the river, sure. And that immediately raises the whole issues of property rights, and does society have the right to tell me that I cannot use my land the way I want to? And it seemed clear to me, yes. If using your land means digging a big enough hole to steal your neighbor's land by processes of erosion, then yes, then society not only has a right, it has an obligation to protect your neighbor's interest.

Swent: Of course, the price of these hillsides would immediately go up too, wouldn't it?

Krauss: Well, there are a lot of them. One of the planning commissioners said, "This is so simple to me. The whole crust of the earth is rock. We have the choice to mine almost anywhere we want to; why do we have to mine in the most sensitive environmental settings?" He was only partially right. Only a part of the crust of the earth makes good sand and gravel, but he had the right sense of it.

Ultimately, it was resolved, and there were incentives given to those people who wanted to develop hillside quarries.

Swent: What kind of incentives?

Krauss: Long-term permits. If you wanted to mine in a quarry, you could get a twenty- or fifty-year permit. If you wanted to mine in the river, you could get a one-year permit. If you wanted to mine in a terrace, you could get a three- or four-year permit. So there was a lot of debate about the extent to which government ought to influence free market economy; should we put a tax on aggregate that comes from some sources and not from others? Is that an appropriate role of government? It was an interesting exercise.

Ultimately, the plan wasn't well implemented. The reclamation requirements that were imposed on terrace mining weren't enforced. All of the permit applications for hillside quarries were denied. The neighbors would rise up out of the woodwork and create so much political pressure. Fortunately, the in-stream mining did in fact diminish; the major dependency was on the terrace mining. And it's still a very lively issue. They're revising and updating that plan as we speak. After great and earnest public debate, they've come to the same conclusions: that mining in the river is the least desirable, that terraces are sacrificing the prime soils, and they ought to go look in the hillside quarries.

Swent: But they haven't been able to make it work.

Krauss: But they haven't been able to make it work. But that was a wonderful learning exercise, too, and that brought me to the attention of the then-Brown administration, Jerry Brown administration. I was appointed to the State Mining and Geology Board by--Huey Johnson was the secretary of resources at the time.

Swent: That was in--?

Krauss: That was in '78. And that was the beginning of my contact with Homestake Mining Company.

Member, California State Mining and Geology Board

Swent: Who else was on the board at that time?

Krauss: Jim Anderson. Jim Anderson and I appeared at our first board meeting on the same day.

Swent: He was Homestake's head exploration geologist.

Krauss: He was the vice president of exploration at the time. Because we showed up at the same time and because we both traveled out of San Francisco to the meetings, we got thrown together a lot, and we--I think we formed quite an interesting friendship. I was very interested in the things that I could learn from him, and we used to sit together on the plane flying off to one place or another. I'd pick his brain about mineral economics, which is really his forte, as well as geology. He kept picking my brain about permitting projects, and I had no idea why. At that point, I had no idea what his interest was.

Swent: They had just started this expanded exploration program.

Krauss: Right. I guess '79 was when we first started drilling the property, and the first public announcement was, I believe, 1980. And the second public announcement was '81. And then in, it must have been 1980, sometime during 1980 on one of our trips, Jim said, "Well, do you think it's possible to permit a gold mine in Napa County?"

I just laughed and I said, "No. You've got to be kidding. Napa County, right next to San Francisco, the home of all of the environmentalism, you're going to put a cyanide tailings pond in the Napa Valley?" Not physically in the Napa Valley, but perceptually within the Napa Valley. "No, it's not possible, you're wasting your time." That was the end of the first conversation, I think.

Then he kept asking me about it. Finally one day he said, "Well, we've got this project."

Swent: You hadn't heard that they actually had one?

Krauss: This was before the public announcement, so I guess he was being good and not spilling the beans.

Swent: I was thinking that the discovery had been made in '78, but--

Krauss: I think Don Gustafson walked onto the property for the first time in '78.

Swent: I think so. I think it was spring of '78.

Krauss: But then there was a long delay, because they couldn't work out the arrangements with Bill Wilder to actually bring a drill rig onto the property until late '78 or early '79.

Swent: Right. But Jim was aware, and picking your brain.

Krauss: Oh, yes. And they were of course working in Cherry Hill before that.

Swent: That's true.

Krauss: And Jim is a very optimistic personality, and he'd got some positive drill results, and he was ready to start building the mine. He was willing to think ahead well enough to be interested in pursuing it.

Swent: But you said it would never work.

Krauss: Well, my experience to that point had been a visit to--ASARCO had a big silver deposit in Imperial County or San Bernardino County called the Calico Mine. They had made the discovery and they had done the exploration, and they had proposed the creation of a mine on the site. There was a lot of debate about the appropriateness of their tailings facility. They were going to--I don't know, they had 50 million tons of cyanide tailings, and of course, the word cyanide created quite a reaction. I was on the mining board at the time, and we visited the site, and we looked at it. I know

I had a lot of questions about, "Can this reasonably be imposed on the landscape without being a threat to--?"

Swent: And Calico is down in the desert, virtually, where there wasn't anything like the vineyards of Napa County.

Krauss: No, not the same kind of public concern.

Swent: And an old mining district.

Krauss: But there were in fact, at that point, people organized in opposition to the mine who were petitioning the mining board to intervene in the permitting of the project.

Changing the Mining Board to a Reclamation Board

Swent: Now, the mining board, just a little bit about them: at that point, as I recall, there really weren't very many mining people on the board?

Krauss: The law was changed in 1975 to create the board as really a reclamation board, and it specified that there needed to be--

Swent: Landscape architect--

Krauss: Yes, a landscape architect, resource protection, public sector. I was the representative of local government, coming from Sonoma County.

Swent: For years, it was dominated by mining people. Phil Bradley[1] was on it nearly forever.

Krauss: Oh, yes, for decades. From its inception, it was a geology board of geologists and miners and prospectors, there's no doubt about it.

Swent: So you came--well, not at the very beginning, but it was a completely different kind of board.

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[1] See Philip Read Bradley, Jr., *A Mining Engineer in Alaska, Canada, the Western United States, Latin America, and Southeast Asia*, Regional Oral History Office, UC Berkeley, 1988.

Krauss: It was fairly close to the beginning. Seventy-five was the passage of the legislation. The first board was seated in '76, and when I joined the board, we were still working on the guidelines for reclamation and for the certification of local reclamation laws.

Swent: Was this because of the SMARA legislation?

Krauss: Yes, that's it, the Surface Mining and Reclamation Act is what revamped the board. Bob Twiss from UC Berkeley landscape architecture was the chairman of the board at the time.

Will Fuller was a mining engineer from Calaveras Cement. Will has quite an illustrious California mining history.

Swent: Also some distinguished family connections there; Buckminster Fuller is his cousin.

Krauss: Oh, really? I didn't know that.

Swent: Yes, I believe he is a first cousin.

Krauss: Oh, that's exciting. He was a good teacher. I used to follow him around. The mining board would take tours--you very quickly discover who you could learn from and who you couldn't on these ventures. When it got to understanding how a mine worked and what its economics were, Will Fuller was right there to--he'd point his cane at that and say, "This will never fly." [laughter] He was wonderful.

Who else was on that board? There was a Georgia Yuan from the NRDC [National Resource Defense Council] who was the environmental protection representative. There was Al Freites, the environmental planner for Sacramento County. Art Grants was a geologist with the U.S. Geological Survey. But you're right, it wasn't the traditional mining board that it had been for many, many decades. And its agenda was reclamation much more than mineral discovery and promoting mineral development. But it was a wonderful opportunity for me to see mining around the state to expand on the background that I had created in Sonoma County.

Swent: You mentioned riding on planes with Jim. You were flying all over the state?

Krauss: Yes, sure. The law actually specifies that the board shall meet in various parts of the state where it has business, where its business applies.

Swent: I remember hearing that they used to meet in Pasadena at the time of the Rose Bowl game.

Krauss: Now, that was the old board. [laughter] Not that the new board met that way. But we visited the Lucerne Valley, the limestone mines, plus Stouffer, and others that have limestone mines. Stouffer is a pharmaceutical company. They had these wonderful high-quality limestone mines there that they used for pharmaceuticals. There's a big cement plant there, too; it's now Mitsubishi, it used to be--I don't know if that was a Kaiser plant. But there are about three big limestone mines all lined up in a row there along the--is it Lucerne Valley or Antelope Valley? I think it's Lucerne Valley.

Swent: I think it's Lucerne. Somebody told me that the restrictions on this--is it the limestone that they use in Tums?

Krauss: Probably.

Swent: And it's the purest in the world down there, and they were able to just put it directly into Tums tablets without any processing at all, and now it's gotten so restricted that they're having trouble.

Krauss: Oh, really? I'll have to go down there and buy a fifty-pound bag of limestone.

Swent: Right. [laughter] All the women are taking Tums for their calcium these days, and the environmentalists are restricting the quarrying of limestone so much, it may endanger our Tums supply.

Krauss: Well, it was interesting to me to see how many mineral products go directly into pharmaceuticals and cosmetics, and toothpaste. There's a little mine in the desert called Hectorite, which is a hydrothermally-altered clay. It's a pure white clay, and it's used in lotions and in suntan lotions. You could have something with exactly the same physical properties and if it were brown or black, you probably couldn't use it in the same way, because human beings wouldn't accept it. But because it's white and has all of these physical properties, it works very well.

But it was a good way to learn about all different kinds of mining, and to hear the opinions of people that knew a lot more about mining than I did in the context of these different projects, and what was going on.

Swent: What was the power of the mining board? Do they give permits?

Krauss: They don't actually give permits. They have to approve local mining ordinances.

Swent: It's an advisory board, then.

Krauss: Yes, they do review and advise local government on whether it meets the statutes, but they also set state policy. The regulations that have to be administered by the local counties and cities are proposed and adopted by the board. So we just adopted in the last few years--

Swent: Did you work with the legislature?

Krauss: We have to report to the legislature on an annual basis, and where there were perceived deficiencies in the law, recommend legislative change. And of course, obtain a budget from the legislature in order to function.

Swent: I think in earlier days, it was called advisory board, wasn't it? At one point it was called the Mine Advisory Board.

Krauss: It might have been, yes. I've never really looked into that history.

Swent: There have been changes of name at times. But you actually had some power?

Krauss: Well, at that point, yes. It was a new law that had to be translated into administrative regulations, into the whole code of regulations. So at that point, yes, it was pretty influential on what burden would be placed on the mining industry in terms of future reclamation requirements.

Swent: So that's how you met Jim.

Krauss: That's how I met Jim. Over the course of the conversations, eventually he talked to me about this mine in Napa County. What caught his attention was the conversation I had with him about the gravel plan, and how the parties had had--there had been a role reversal, how the environmentalists were promoting mining and the mining companies were opposing it. Because he mentioned that a number of times in subsequent conversations.

But at one point, he asked me if I would be interested in helping the company get the permits for this mine. I thought about it for a long time and said yes, that would be an interesting experience.

Swent: A real challenge.

Krauss: A real interesting learning experience. It wasn't an offer; it was just an inquiry: "Would you be interested in doing it?" We talked about it over a period of time; it wasn't just one conversation.

I think gradually I came to hold the opinion that, well, if you did it right, you could probably get the permits for it. But it would have to be the kind of effort, the proactive effort that it ultimately was. You'd have to identify all those people that felt they had a say in it, and work with them and get them on your side, or you'd--. If the community ever decided that it shouldn't go forward, Homestake would not have ever been able to permit it. It was that clear. And there were examples of projects, of major industrial projects in the state, that had died as a consequence of public opposition.

Dow Chemical's Negative Experience with Permit Requirements

Krauss: And in fact, there was legislation at that same point in time, in the late seventies, early eighties, there was legislation to streamline the permitting process and try and remove these obstacles to economic development. I guess the most famous case was Dow Chemical trying to develop a PVC plant in the Pittsburg-Antioch area along the Carquinez Straits, or upstream of the Carquinez Straits. They went through this progressive series of further permit requirements. They'd present studies and the county would say, "Well, that's great; now we want another study on another issue."

And there was no time frame to the process. There was nothing in the law that said you have to decide to approve or disapprove it in any fixed period of time. There was nothing in the law that said what you had to present studies on and what you didn't.

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Krauss: I guess they finally concluded that they were involved in this endless progression of regulatory requirements that were not defined, and there was no apparent end to it. They finally decided to abandon the investment in California and build a plant in Texas. And of course, they did that with a certain amount of fanfare and publicity, and the legislature responded by amending the laws, passing what they called a permit streamlining act that essentially said all of the requirements for a permit had to be laid out up front, and there had to be a determination that an application was complete. Once that determination was made, that you couldn't amend it, you couldn't require further studies or additional analyses after you had made that decision, and that the permits had to be processed in a set period of time. There were twelve months established as the limit for preparing an environmental report, and eighteen months from beginning to end to issue the permit.

Swent: Do you recall when this was?

Krauss: Well, it could have been as late as '80. It extended over several years, because it was still going on when I was working for Sonoma County.

Swent: And you were well aware of it, I'm sure.

Krauss: Oh, yes. There was a lot of discussion in the press about it. And I think it was in the Jerry Brown administration that the laws were amended. Of course, the solution is not as tidy as the legislature intended, because now when you come up to your deadline, if the agency hasn't acted in eighteen months, they simply say, "Well, we'll act; we'll deny your permit. And if you'd rather we didn't deny your permit, then you can waive the provisions of the permit streamlining act and allow us to spend more than the eighteen months to consider your permit."

But it did create an expectation of a particular process, and it did in fact expedite the processing of the permits. It was something that I used as leverage with the regulatory agencies as we moved McLaughlin forward. You could at least remind them that the legislature expected them to proceed in a particular manner, even though they ultimately could simply deny the project.

Swent: So this act put the pressure on the government bodies?

Krauss: Yes. I think the public debate is this, "Have we lost the ability to sustain our economy?" It was the beginning, I guess, of the arguments that we're talking about jobs versus the environment, and are we regulating to death our private sector?

Swent: And there was an economic downturn at that time, also.

Krauss: Oh, yes, absolutely, and the need for the jobs, and the need for the investment was--.

Swent: A few years earlier, everything was rosy and thriving, so there wasn't the economic pressure then, either.

Krauss: Yes. But I think the impact that had on me was knowing that a company as large as Dow Chemical, who had plenty of resources to bring to bear on the issue--I guess the impact on me was the realization that a company with the clout of Dow Chemical could be frustrated in their attempts to create a project. And that hardly had the emotional impact of cyanide tailings. Certainly it was not a sure thing that permits could be obtained.

Swent: Although Dow had a very bad name for a number of years--I guess it was earlier than that, during the Vietnam war, that Dow became such a nasty word.

Krauss: Oh, yes, sure.

Swent: But that was ten years earlier, I guess.

Krauss: Sure. But then Homestake's reputation was not, at least in the environmental community, was not the best. When I first considered, when I had finally had an offer from Homestake to take the job--

Homestake's Job Offer: A Heavy Decision on Both Sides

Swent: Did Jim give you the offer?

Krauss: No, Jim referred me to Don Gustafson and Dave Crouch and Bob Reveles, and they were the ones who interviewed me. I think it was through David and Langan [Swent],[2] really, who ultimately made the decision.

Swent: I know Lang took pride in your being hired.

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[2] See Langan W. Swent, *Working for Safety and Health in Underground Mines: San Luis and Homestake Mining Companies, 1946-1988*, Regional Oral History Office, UC Berkeley, 1995.

Krauss: I think he was responsible for it. David reported to him, but he never talked to me directly about it. David made the offer.

Swent: I remember when he was so delighted at your selection.

Krauss: Oh, really? That's nice to know. No, it was clear that it was through David's budget that I was employed, and he reported to Langan at the time. But Dave and Don and--I guess Jim asked me if I would be interested, and if I would, would I give him a resume to pass on. I gave him the resume, and he passed it on to Dave. Then I didn't hear anything for months and months and months.

Then I was asked if I would join them for lunch for an interview. We had lunch in Yountville at the Washington Street Cafe.

Swent: This was with the three?

Krauss: This was the three of them. And it was a very relaxed and friendly conversation. We talked for probably an hour and a half. I was asking them about the project, and they were asking me about my experience. It was obvious that they had already moved the project along quite a ways. I certainly didn't come in at the beginning of this effort. There were already consultants collecting baseline data, there were already botanists looking for rare plants. There was a lot of concern about obtaining the air permits for the project, and being prevented from developing the project because of the sensitive plants in the area. There had already been contact through Napa County.

The Napa County planner who was overseeing the exploration permits of the baseline data at that point was a member of the Native Plant Society.

Swent: Who was that?

Krauss: That was Stephen Rae.

I always had the feeling that one of the pluses on my side in being selected for the job was the fact that I did know these people personally and had worked with them for so many years.

Swent: Although they were in another county, but you had still had dealings with them?

Krauss: Sure. Oh, yes, we worked together all the time. With the Environmental Quality Act, when it first passed, there was no history, there was no tradition on how reports were prepared or what their substance was or what the appropriate approach was. So we formed a group called the North Bay Environmental Planners Group. Stephen and I actually worked together in recruiting the people.

Swent: Were you one of the organizers of that?

Krauss: Yes. And we had periodic meetings to review, as the state issued new regulations and guidelines for preparing these things, we'd call all the environmental planners from Contra Costa County, Napa County, Solano County, Marin County, and Sonoma County. We'd meet in one of the counties and we'd spend a day talking about how we were going to deal with these new requirements. And there were periodically meetings in Sacramento with the Resources Agency and the Office of Planning and Research on how to deal with these things.

So when David said that he was worried that there was this planner that worked for Napa County who was also a member of the Native Plant Society, I said, "Oh, you must mean Steve Rae." [laughter] One of those moments when you think that you've connected with somebody.

"Oh, yeah, that's the one. Do you know Steve?"

"Oh, sure, Steve and I work together all the time." And Steve is quite an avid environmentalist and a committed member of the Native Plant Society, but he's also a fairly practical kind of person.

I know that David said, "Do you think you can work with him and deal with these problems?"

I said, "Sure. We've had years of experience working together."

But I was still concerned that working for Homestake and working for this project was something in my career that I wanted to undertake, too. It was a mutual exploration. Georgia Yuan from the mining board went through NRDC's files and pulled out her Homestake file, and all of the environmental issues that they had been watching Homestake deal with over the years. I guess Grants [New Mexico] was an issue then, and I don't know whether Superfund was around yet or not, but there was talk about--

Swent: NRDC is National--

Krauss: Natural Resource Defense Council. It's a major national environmental organization, and they're in constant communication with Sierra Club and Sierra Club Legal Defense and Wilderness Society.

Swent: Grants was the uranium mine in New Mexico.

Krauss: They had a file on Grants, they had a file on Whitewood Creek, they had a file on Pitch, and all of the--

Swent: Whitewood Creek is South Dakota, the Homestake Mine, and Pitch was the uranium project near Gunnison, Colorado. That was a disaster, in a sense.

Krauss: Well, I would hope it had been a learning experience for the company.

Swent: Yes.

Krauss: I don't know whether it was. I've never asked Harry [Conger] whether or not it was for him.

Swent: I don't know that Harry was involved in that.

Krauss: Was that before his time? Bill Langston had been there as an attorney, and I know he learned from it, because he and I had conversations about what went wrong there.

Swent: I think a lot of people learned from it. Well, what happened there, we should say for the record: the community, tremendous community opposition to this uranium mine, and hearings--

Krauss: And the company itself made some major blunders in its own strategy. It proposed to build a uranium mill on an environmental assessment rather than doing an environmental impact statement, and the Wilderness Society took it to court and immediately won an injunction, because it was blatantly deficient, just procedurally deficient, not to do an EIS for a project like that. It was a totally avoidable circumstance. The cost and burden and time to do an EIS is very little more than to do an EA. And yet, there are companies today--Magna has a project in Nevada that is now in court because they did an EA instead of an EIS.

Swent: The environmental assessment is a--

Krauss: It's an abbreviated form of an environmental impact study. But there they are, still saying, "Gee, why should we--?" And they get very righteous about it. "Why should we have to do the whole EIS?" Because if you don't, you've got to pay the price.

Dispute Resolution and Mediation at Pitch, Colorado

Swent: The situation at Pitch became very polarized, as I recall.

Krauss: Yes. Actually, it ultimately broke new ground in terms of dispute resolution and mediation. I think there was third-party, that they finally agreed to enter into facilitated mediation, and it shows up in the alternative dispute resolution literature as a primary early case in alternatives to litigation. It was a facilitator that was hired who conducted meetings between the company and the Wilderness Society, and ultimately they entered into a settlement agreement. There was a stipulated agreement that allowed the project to go forward.

And then the final blow, of course, was the day the license was issued, the board of directors voted to abandon the project, because the economics had died, with the uranium market.

Swent: A lot of blood was shed for nothing.

Krauss: Yes. But I've always wondered what influence that had in the company, with regard to how they proceeded with McLaughlin. I've never had any feedback on that, I've never had any insight on that. I'd be curious sometime--

Swent: One hopes that they learned from it.

Krauss: Oh, I'm sure. At least those people that were directly involved in it. John Ransone was involved in that very heavily, and Bill Langston I know was the attorney who negotiated for Homestake all of that.

Swent: George Simcuk was the manager there?

Krauss: Yes, the general manager.

Swent: It was a very painful experience for him all around, I'm sure.

Krauss: He was pretty good at it, I think. He was kind of buffeted.

But Georgia pulled out all these files from NRDC and made copies of them and gave them to me. She came to me and she said, "I think you ought to think twice before you accept this job."

Swent: She didn't want you to--?

Krauss: Well, she said, "It sounds to me like you're getting tied up with a company that's not particularly environmentally responsible." And that was on my mind when I sat there that day talking with David and Bob and Don. But there was nothing in that conversation that reinforced that point of view when I talked to them about, What is the policy of the company, and what is it that you propose do to here, and how do you expect this to transpire?

They said, in effect, "We will comply with all of the environmental laws, and we want to do this right, because we know that it's under a lot of public scrutiny, and it's going to have to be done right."

Swent: So they were up-front about that?

Krauss: Yes. Apparently, those decisions had been made. I'm sure Langan was party to those--certainly he and David had talked about the philosophy of moving that forward. The work that was ongoing at that time reflected that philosophy. When the rare plants were first discovered in the vicinity of the site, the decision was made to expand those surveys and get a complete inventory of the plants in the region. That was instrumental in persuading the Native Plant Society that those losses that would occur were not prohibitive, would not endanger the survival of the population in the area. That decision was made before I came on board.

Swent: That was one of the first challenges that Homestake met, I guess, wasn't it?

Krauss: That always struck me as being representative of the philosophy that somebody had set, and it had to be Langan and David, because I don't think--

Swent: I think it probably was.

Krauss: They certainly probably told Harry that that's what they thought ought to be done, but that's where it came down, I'm sure.

Swent: I think so. But it wasn't a decision you made lightly?

Krauss: No. No, and it wasn't a decision they made lightly, either, I'm sure. I had given them a list of references. Tom Cordill, who was my boss in Sonoma County, was among them. He told me one day that he had spent, I don't know, two and a half hours on the phone with Dave Crouch. I was dumbfounded: "What in the world could you talk about for two and a half hours about my working for Homestake Mining Company?" But I got the impression that it was a very thorough consideration.

It seemed to me evident that I was the man for the job. [laughter] It was evident to me. And it never really occurred to me until years later that there might have been other candidates for the job. I was frustrated by the amount of time that it took. Between the time of that interview in Yountville and the time that I was ultimately given an offer was three or four months.

And of course, there were changes in the company at the time. Bill Humphrey had just come on board, and I think one of the comments David made was, "Well, we're hiring a new vice president of production, and he needs to be party to this decision. We're not going to make a final decision until he's on board and he has time to think about it." I did have an additional interview with Bill Humphrey before the--

Swent: His background was with Newmont, and I don't know what their philosophy was on this kind of thing.

Krauss: Right.

Swent: Did you get any sense of that?

Krauss: Well, it was another one of those role reversal meetings. I met with him and, having some sense of his background, it was my intention to impress him with how practical I was and how willing to consider the dollar and to do things effectively and efficiently and timely. He was very outspoken about being environmentally correct. Somehow, he felt that he had to tell me that he was environmentally sensitive. [laughter] So I guess we played our little role reversal game. But in the course of that, I think we struck up a good relationship, because we worked well together really from there forward.

Though there were other incidents when I know he was very hard at Pitch on the reclamation dollars they were allowed to spend. He was not the least bit encouraging to promote the state of the art reclamation there. He just wanted the cheapest thing, to get out of it. Once the mine stopped producing income, well, that was certainly an understandable point of view, but that was also reflective of his philosophy.

I wasn't there, but the story is told that on his first visit to McLaughlin, he stood on the old Knoxville-Berryessa Road and looked down at Hunting Creek and said, "Why the hell can't we just dump our tailings down there?" Now, that might have been in jest, I don't know; like I say, I wasn't there. But more than one person told me that. My conclusion was that, Boy, I've got my work cut out for me.

Swent: Well, of course, he worked--all of his operation work was at Cananea, in Mexico, and there was little or no environmental consciousness there, I'm sure. Partly because of the time. It just wasn't thought of in those days.

Krauss: It wasn't part of the equation, no.

Swent: And Anaconda didn't have a reputation for being all that sensitive.

Krauss: No. But ultimately, he turned out to be very supportive. He followed it personally very carefully, and he actually went to many of the public hearings. I know I was reluctant to have him sitting in the public hearings, because often you'll get proposals from the public to impose requirements on the company, and you always like to be able to say, "Well, that's a great idea; let me go home and talk to my management about it." But when your management is sitting right there, you lose that opportunity.

But after a while, some of the hearings in Yolo County got to be so bizarre, I was absolutely glad he was there, because--

Swent: He wouldn't have believed it otherwise?

Krauss: Yes. I think if I had had to go back and carry that message, he would have murdered the messenger. [laughter] I don't think he would have ever believed the extreme statements that were made by people, and the emotion that was involved in it, and the just craziness, that we were going to be another Love Canal. Things that had no relevance to the hearing were debated at great length. The people conducting the hearing never required that it be focused, they just let it go. So he was the one that told Harry about that, not me, and I was just as glad.

Swent: Yes. Well, we'll get to those in a little bit, I guess.

So they did make you an offer.

Krauss: They did. David called. We had debated salary and other things, and reached a meeting of the minds, I guess. Actually, after talking on the phone, he sent a written letter, and I sent a written acceptance.

III ENVIRONMENTAL MANAGER, OBTAINING PERMITS FOR THE MCLAUGHLIN PROJECT, 1981

A Chance to Play with a Full Deck in the Permitting Process

Swent: This was in 1981?

Krauss: Eighty-one. I started in June of '81 finally.

Swent: And you didn't have to move, did you?

Krauss: No. I was already living where I wanted to live, and they--the first office that we started, there was a little office in Napa at the time that Don Gustafson had started.

Swent: They already had that.

Krauss: Yes, so that was an easy commute. It wasn't that far from there to the mine, or from there to San Francisco, or to the San Francisco Airport.

Swent: Did you go and visit the mine before you accepted?

Krauss: No, I did not.

Swent: Oh, you hadn't seen it yet?

Krauss: I hadn't seen it on the ground. I'd heard about it; I didn't know what its setting was. It's in Napa County, but it's such a remote corner of Napa County that not many people associated it--. I knew where it was, and I had talked to people about it. I had a visual--I hadn't seen it, but I had a pretty accurate understanding of where it was.

Swent: What had you heard about it?

Krauss: Just that it was a very remote area. That it was a remote area that had been badly abused historically, and that there were a bunch of marijuana growers and hippies and other low-life hanging out in the woods up there, and it was a strange and remote area. But I also knew it was in the watershed of Lake Berryessa, and that it was subject to the approvals of three counties--Napa County--well, at that time Napa and Yolo County, and very shortly thereafter when we started looking around for tailing sites, Lake County.

But no, my final conclusion was, This is going to get mined whether I'm party to it or not. This company is not going to back off from this; it's too important to them. If I'm party to it, maybe I can make it a better project than it would otherwise be. But whether or not I accept this job is not going to determine whether or not the project proceeds. That made me feel that I wanted to go ahead with it.

Swent: Did you meet any flak from your environmentalist friends?

Krauss: Oh, yes. Georgia in particular, and some of the people that I'd met through her were discouraging. I had been asked to--through Georgia, I had met people in the San Francisco office of Sierra Club and Wilderness Society, and there was actually a little gathering of environmental organization people who dealt with mining projects. There was a project at the time in northern California called Gaskay Mountain, a proposal for a nickel--it was lateritic soils, nickel project up on the Smith River, or up in Del Norte County, on a wild and scenic river, a project to essentially harvest the soils over hundreds if not thousands of acres and extract the nickel from them.

The name of the company at the time was Calnickel. I don't know who was behind it or whose investment money was behind it, but ultimately, I think, it was a promotional scheme and not a legitimate mine. But they had gone forward with permit applications. It was on Forest Service land, I believe. The environmental community was up in arms over it, and they had asked me as a member of the mining board with some experience in mining to review the environmental documents with them, and comment on them.

So I had met many of these people in the environmental community through the Calnickel project, and they were very discouraging. It's very black and white in some people's minds. If you're on the wrong side, you're on the wrong side, and working for a mining company is on the wrong side, so far as they are concerned.

Swent: So you were a turncoat.

Krauss: Yes. But it didn't discourage me. My feeling, working in the county, it was interesting, working with the geothermal projects. The engineers would come in and I'd say, "Gee, can't you do this? Can't you move your well somewhere else, can't you smooth the ground out and use these grasses to revegetate it?"

And they'd say, "No, it's too expensive."

Well, what's too expensive? As a regulator, I was never privy to all of the information that they had in managing their projects. One of the feelings I had was, Well, at least this time, working for Homestake on this project, I'll know what all of those numbers are. I'll know what's too expensive and what's not too expensive, and I'll be able for the first time to play with a full deck, was the way I told it to myself, instead of just seeing part of the picture.

Swent: And maybe it could be done right, and economically, too.

Krauss: Yes, sure.

Swent: Which I think you proved ultimately, didn't you?

Krauss: I hope so. I don't know if Harry believes it, but I do. I've looked at the numbers very carefully.

Swent: But actually, I think--well, we'll talk about this later on--but some of the things turned out to be actually more economical to do them right, didn't they?

Krauss: In the long run, absolutely, yes. If you take the long term view, one of my conclusions is that what's economically sound is also environmentally sound. So long as you keep your garbage at home and--

Swent: Right. But if you're just doing it day-to-day, it isn't always clear that way.

Krauss: Well, and when you're comparing it to a historical way of doing business. If you're comparing it to dumping the tailings down the creek, then it involves more cost. There's no doubt about it.

Swent: So you were welcomed on board.

Krauss: So yes. I started on the 19th of June in 1981, with a meeting with Dave Crouch. I met Langan at the time. That was the first time I think I met Langan. Dave introduced me, and he showed me around the office, and introduced me to people. I had gone out and bought myself a new suit, and I was--

Swent: This was in San Francisco?

Krauss: Yes. I figured I had to fit the corporate image, if I was going to work for a company. [laughter] And met all the people, and reviewed his files on what was going on, and did all the personnel things. He assigned me to go to Reno and meet with Don Gustafson and review the files that they had there in the exploration office.

Swent: What was your charge?

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Swent: You were environmental manager for the McLaughlin Mine.

Krauss: The McLaughlin Mine, with responsibility to obtain the permits for the mine and to do the environmental planning for the mine, and to basically interface all of the environmental aspects of the mine with the metallurgists and the engineers and contractors, and make sure the things that we were required to do by our permits were implemented in our project.

Swent: And you reported to Dave Crouch?

Krauss: I reported to Dave initially.

Swent: Had Jack Thompson come in yet?

Krauss: Jack Thompson hadn't yet come.

Swent: Don Gustafson was still--?

Krauss: Don was still nominally project manager for McLaughlin, and there was a guy by the name of Bob Ackwright, who had been--I don't know where he came from or where he went to. He had been hired as the McLaughlin general manager.

After meeting with Dave and going to Reno, I was told to report to an office in Napa. There was a bookkeeper by the name of Irma Taylor, a very interesting woman who's since passed away, whose two or three husbands had all been involved in mercury mining in the district. She had a wonderful sense of history of the Coast Range and its mercury mines. We spent a lot of time talking about those things. But Irma was sitting there doing bookkeeping for the project, for the exploration effort, and also involved in entering the drill core assay data into the computer.

Bob Ackwright was the general manager. I can't remember whether he hired Linda Thomason or whether Jack Thompson when he came on board hired Linda Thomason as the secretary. On Villa Lane in Napa. A little new condominium office project.

It was just a couple of months later that Jack Thompson was hired. Bill Humphrey came on board at Homestake, and I can remember Jim Anderson telling me that they were interviewing a candidate for general manager, and that "You'll really like him. He's young and has a lot of experience, very bright." All of which was true. And for the next two and a half years, we shared that office in Napa, pursuing the permits. At that point, I reported to Jack. He became my boss.

For a while, we had one of the geologists in the office, too, Bill Bagby. He had been hired by Jim Anderson as a research geologist to understand the hydrothermal systems, the geochemistry and deposition of the McLaughlin type ore body, to expand that as a research model I guess for application elsewhere.

Swent: They were pretty excited about the geology at that point.

Krauss: Yes, they were. And I think there was a feeling that that same kind of occurrence could be found elsewhere. Of course, at least on the West Coast of the U.S., we haven't found another one.

Swent: No. Those were heady times.

Krauss: Well, and that reflected Jim's personality a lot, too, I think. He was a very optimistic person. Sunny Jim, we called him.

Swent: Oh, did you? [laughs]

Krauss: I don't know if he knows that to this day.

Swent: I hadn't heard that.

Krauss: Yes, he'd get two or three drill holes back, and he'd have a world-class deposit. That's the kind of enthusiasm that an exploration geologist needs.

Swent: Right. It wasn't always justified, though.

Krauss: No.

Swent: So where did you begin with something like that?

Krauss: Well, David had already done some work on--just hired a consultant to inventory all of the necessary permits, all of the laws and regulations that had to be met and complied with. And of course, from my experience in Sonoma County, I had a good feel for that as well. So I went through the original documents that he had, and--

Swent: Who was this, do you remember?

Krauss: D'Appolonia at that time.

Swent: Oh, David had already selected D'Appolonia?

Krauss: Yes.

Swent: And they're in San Francisco?

Krauss: No, they were in Irvine. I spent many an hour flying back and forth to Irvine. Yes, there was a structure in place. D'Appolonia had been hired, and they had done an inventory of required permits, and they had put together a preliminary inventory of the environmental baseline information that needed to be pursued or collected. They had actually, I think, begun to do some of the air quality data. They had a couple of air quality stations set up at the mine site.

Swent: Why was air quality such a problem? Actually, it wasn't toxic, was it?

Krauss: Right. From a regulatory standpoint, that was one of David's biggest concerns. And ultimately, he was justified in that concern, because it was one of the few permits that was appealed and went to an appeal hearing. That involved not--well, we had three different air districts: Bay Area Air Quality Management District, Lake County, and Yolo-Solano. But the Bay Area district was the most difficult of them. And like a lot of things, we were kind of the first wave of a whole new set of mines, and a lot of questions came up that hadn't been debated, hadn't been resolved.

What model do you use when you're modeling fugitive dust associated with a mining project? Most of the air quality models are gas dispersion models that are plume dispersion models, and they don't really deal with contaminants that are heavy particles that fall out that have a deposition--

Swent: This is from your blasting in the pit?

Krauss: From blasting, and trucks. And loading and dumping and bulldozers.

Swent: Because there's no effluent from stacks.

Krauss: No.

Swent: No smelter.

Krauss: [laughter] No smelter.

Swent: And even at your mill, you only have steam.

Krauss: We have steam from the autoclaves, and we have been required to check that. We do have a carbon kiln that reconditions the carbon that gives off a bit of mercury that we've had to carefully manage and control. And the refinery, the electro-winning cells and the furnace in the refinery.

Swent: Where does the mercury come from?

Krauss: There's mercury in the ore.

Swent: And then that gets into your--

Krauss: It travels with the ore through the process, and the major portion of it ends up as an insoluble compound in the tailings, which is one of the advantages of the autoclave system. But some portion of it reports with the gold and the silver to the carbon in the CIP [carbon-in-pulp] circuit.

Swent: And that goes out in the air?

Krauss: And then when you strip it from the--it has the potential to go out in the air, and then you have to put in an air control device to trap it and prevent it from going into the air. But it's very minute; it's hundredths of pounds per day. It's not like--

Swent: Not like the old days.

Krauss: Even the federal limit for a mercury-producing plant is five pounds a day. We've never approached 1 percent of that, so it's not of any real consequence, but it's something that you have to be aware of and work at.

Swent: So do you have any idea why Crouch had selected D'Appolonia?

Krauss: I'm not sure. You'd have to ask David that question, what process he went through in selecting them. In addition to D'Appolonia, he had selected SRK from Denver to do the waste disposal designs, the tailings pond and the waste dumps. I think that was based on his personal experience of having worked with some of their people on other projects. There were several people that he knew from his previous work with Utah [Construction and Mining Company]. John Welch and Phil Dedyker, I think those were probably the two that were--. John Welch was the SRK project manager at the time.

I don't know if David had known Ed Sirota. Ed Sirota was the D'Appolonia project manager. He had hired Dames and Moore, a man by the name of George Corelco, to help with the socioeconomic background. He had I think made the very wise decision to direct

D'Appolonia to work with local experts, so D'Appolonia was subcontracting with local botanists to do the plant surveys. It wasn't a totally remote project of nonfamiliar experts to the area.

Swent: So these decisions had all been made, then, by the time you came on?

Krauss: Yes.

Swent: Were you comfortable with them? Did you think they worked all right?

Krauss: Oh, yes. I don't think there was any problem with any of them. Like all such companies, there was a lot of turnover in personnel over the time frame. Working with consultants, you learn very quickly that you're in the business of educating consultants when you hire them. [laughter] You pay them for the opportunity to educate their personnel. And even SRK, we lost John Welch and acquired Ian Hutchinson, who turned out to be quite good, as their project manager. Ed Sirota stayed on, but a lot of the people working under him changed over.

And then the other piece of the puzzle was a Homestake structure. They had identified a McLaughlin task force that met regularly in Denver to pursue the project.

Swent: In Denver?

Krauss: Yes. Initially, they were meeting in Denver. That's where the engineering group was, and that's where the metallurgical group was. The task force was basically focused on those two tasks, was selecting a process for the McLaughlin ore and then engineering the facilities.

Swent: Did you meet with them?

Krauss: Met with them regularly, yes. That involved Bob Previdi, who was the mine engineer. I think Mike Attaway was on board by then. I probably have the list of them in my notes here somewhere.

Swent: We can get them, I'm sure.

Krauss: Of course, Don Gustafson, Dave Crouch. Denny Goldstein was the attorney that dealt with the project, not Bill Langston, all the way through. Bob Lear was the metallurgist, and his team, John Turney and Richard Kunter and Dwight Carey. John Ransone, of course, was there on the engineering. I think Mike Attaway may have been on board by then, or shortly thereafter. Maybe Jack Thompson hired Mike as his mine manager.

Swent: I think he did.

Krauss: So he would have come a little later. But I know he was in some of those meetings, he was there. And basically, it would proceed through--it was the forum by which all of the pieces of the puzzle were coordinated. As metallurgical decisions were made, those were passed on to the engineering group, and as the engineering group moved forward, they needed information on permitting requirements and restrictions, they'd ask us for those answers.

Swent: They were moving ahead assuming that they'd get the permits?

Krauss: Oh, yes, there was never any question in anybody's mind. It wasn't, "Wait until we get the permits and then we'll spend the money to engineer the project," it was, "Go." It was fast track, it was do it, do it now, in the shortest possible period of time.

Swent: Put a lot of pressure on you, didn't it?

Krauss: Well, it put a lot of pressure on everybody. And in many respects, because we were working on such a short fuse, the permitting effort put a lot of pressure on engineering, because the answers that we needed to provide up front to be reviewed in the permitting process, they weren't prepared to offer yet. There were decisions that they hadn't made yet in terms of process chemistry and waste characterization.

Swent: Just the siting.

Krauss: Yes, even the size of how big a tailings pond do we need, or how big a waste dump do we need.

Swent: And where to put it.

Krauss: Yes. So it was an interactive process. We defined all of the elements of the project, and kind of pursued them all simultaneously and met to work together to get them all reconciled. It worked pretty well, actually. I think it was a pretty decent exercise.

One of the smartest things that was done, and again I think it was Langan and Dave Crouch, was to make a very early filing for water rights. The filing for water rights preceded all of our other permit applications. It had been advertised for public notice long before there was much public awareness of Homestake or the McLaughlin Mine, and there was no opposition to our proposal for water rights. Obviously, that would have been one of the key points for opponents to have gained leverage on the project.

Swent: That may be part of Homestake's history. I remember Lang saying that one of the smartest things that old George Hearst ever did was that he scurried around and got water rights, and that's what put him ahead of the pack up in Lead, the original Homestake mine up there.

Krauss: He was the only one that had water to run a mill, yes. Well, again, it wasn't my decision, it was something that was in the works. It proceeded very smoothly.

Swent: Although water was a problem?

Krauss: Well, there was no ground water. There was a lot of issue of acquiring the property necessary to accommodate the reservoir. The individual from whom that property was acquired was--

Swent: Was that Kauffman?

Krauss: Yes, Kauffman. Bob Kauffman was a very difficult person to negotiate with. Fundamentally, he had decided to sell the land, but he was always convinced that he wasn't getting the best deal he could out of it, so he was committed to selling, but he was very reluctant to close. [laughter] Dennis Goldstein would be the one to tell you the stories of Bob Kauffman and those negotiations. They were endless.

Swent: So that hadn't been tied up yet when you came on?

Krauss: No. And in fact, the question of water supply for the reservoir location was resolved fairly late in the process.

Swent: Did you have anything to do with those decisions?

Krauss: Yes, I was fully a member of the task force when that went forward.

Meeting Unanticipated Water Needs

Krauss: One of the things that didn't get well considered, and I hold myself partially responsible, was the consideration of water for construction. You mentioned the talk about the cost of the project being forced upward by environmental considerations. Well, a big piece of that $50 million was acquiring temporary water for the construction period. Davy McKee, the company hired as construction manager, had overlooked it, Rex Guinivere had overlooked it, John Ransone had overlooked it. All of a sudden, we were ready to start construction, and we needed water for compaction and dust control and normal construction activities, and there was a crash effort to acquire water from the Lower Lake Water District, and the construction of ultimately a twenty-mile pipe line and pumping stations to pump that water from Cache Creek and the Lower Lake Water District to the mine site for the construction period. That was, I don't know the exact cost, but it was somewhere around a $5 million project by itself, perhaps more than that, that was--

Swent: Which hadn't been anticipated?

Krauss: Which hadn't been anticipated. So there's a big whack of that overrun right there, just--. And that was an environmental cost, according to the engineers. And I suppose it was; you need water to contain dust and you need water to condition soil to properly compact it. But it was a convenient way of categorizing it from their point of view.

Swent: You got the blame and they didn't.

Krauss: Sure. Well, I don't know that it was personal. It wasn't personal, it was just that it was an acceptable way of telling the stockholders that we needed to spend more money. I think that was the bottom line. If we tell them that, gee, we had to spend more money for water supply than we thought, well, then--but if you say, "Gee, you know, we did our very best, but the environmental costs ate us alive," then it was an acceptable way to put it.

Swent: Just for my own personal satisfaction, I need you to clarify something that's here in your report that I didn't understand. Talking about the water, it says the annual rainfall is thirty inches, and the evaporation is sixty, is that right? Twice as much evaporates as falls, and I don't understand how you can do that.

Krauss: Well, the potential to evaporate exceeds the rainfall by twice. And that's why California turns brown every summer.

Swent: Right. So--

Krauss: If you continue to put water into a lake or into a pan--scientists measure it with what they call pan evaporation--over the course of a year, you'll evaporate sixty inches of water.

Swent: But if it isn't there, it can't evaporate.

Krauss: No. And that's when you say you have an excess of really evaporative potential, is the better way to describe it.

Swent: And you had the--this had to be taken into account in your ponds and so on.

Krauss: Sure. Probably the biggest difficulty in managing any mining project is water balance, and the least accurate of any of your engineering calculations for a new project is water balance, and the most frequent adverse environmental consequence of a mining project is having contaminated water that you have to discharge. So it's a critical set of relationships, and I've looked at projects all over the world, and I have yet to see one where the initially calculated water balance was accurate, was predictive. Even plus or minus 50 percent or 100 percent is very good for coming up with an initial water balance. You don't always know how much water you're going to have to pump from a pit in order to dewater it.

In our case, we didn't recognize that the autoclaves would affect the viscosity of the ore in the process. For whatever reason, the autoclaves created a more viscous ore in full scale than it did in the laboratory scale, so we had to put more water into it to dilute it to get it to go through the screens. So we used a lot more fresh water than the plant originally anticipated, and then we had accumulated a lot more tailings water in the tailings pond than we originally anticipated. We had to go back to the drawing board and design a recycle loop so that we actually take tailings water from the pond and run it through the plant in a way that destroys its cyanide content and precipitates out its metal content, and recycle it five miles down the road back to Napa County. That was not part of the original plan. And yet, the plant could not operate without that recycle.

And we had to go back to all the permitting agencies and persuade them that that was not an unacceptable environmental exposure, to run five miles of pipe line carrying water that came out of our tailings pond--

Swent: And this came in after you were actually in operation?

Krauss: Yes. We installed that probably two or three years into operation, '88.

Swent: And had to go back for new permits for it?

Krauss: Yes. And had to persuade the Solano Irrigation District, who was the party concerned about water quality, that that was something that was acceptable.

Swent: So there were three counties and three air quality boards, and--

Krauss: Two Fish and Game regions, federal authority from the BLM [Bureau of Land Management], had to coordinate NEPA requirements and CEQA requirements.

Swent: NEPA is--?

Krauss: National Environmental Policy Act, and the California Environmental Quality Act.

Swent: Okay. Have to get all these acronyms straight. So the first thing was the water rights, but they'd already been obtained.

Krauss: Hadn't been obtained, but the process of obtaining them had been initiated. The first step in that process after you file an application for water rights is a public notice of the filing. There's a fixed time period during which the public can protest that filing, after which that window of opportunity closes, and then it's a bureaucratic process that continues. Ultimately, the permits were not approved until two or three years later. Right now, I'm just proceeding with final license on the water rights, the way the process works. You get the permit to appropriate water, and then you have to put it to beneficial use and demonstrate that you're using it for a period of years, and then you can finalize that license to use water.

Swent: So after all these years, you're still--

Krauss: I'm still doing permits, yes. And will be. So do you want to go through the chronology of all of this?

Swent: We have to, I think so. Maybe we should take a break, it's been two hours. It's twelve-thirty.

The Mine Site: An Opportunity for Environmental Improvement

[Interview 2: December 18, 1996] ##

Swent: Today we're meeting in the Homestake office in San Francisco, and this is December 18, 1996. I think we decided we'd start with your first trip out to the site. You were working out of the Napa office--

Krauss: We had established the office in Napa, and Bob Ackwright at that time was still our project manager. Bob took me to the site--the best access to the site, of course, was from Napa County, at that time; that was prior to the construction of the Morgan Valley road. So we drove up through the Napa Valley and Angwin and down through Pope Valley, and up along the Eticuera and Knoxville Creeks from the north end of Lake Berryessa--the road is really in the same shape today that it was fifteen years ago--

Swent: It was already paved?

Krauss: Well, it was painted black; I don't think you'd call it paved [laughter]. It was what they call chip-sealed. But it had--all of the stream crossings were low-water fords. And in the wintertime--

Swent: That is from Berryessa on?

Krauss: From Berryessa on, right. And it remains impassable after storms even today. But it's a nice way to approach the site because you do start from the downstream watershed and work your way up into the upper watershed where the mine is located, which does, in fact, sit on the ridge between the Putah Creek and Cache Creek watersheds. And it gives you, environmentally, the sense that because it is high on the watershed, you don't have a lot of through-flowing water to have to manage from an environmental protection standpoint. It's a fortunate site in that respect. It was summertime, early summertime, so the vegetation had turned brown. The chaparral and the oak trees, of course, remained green. And we drove up--as you approach the site from the south, you drive through the old town of Knoxville--at that time, the old Redington mine company store/office building was still standing. It has subsequently been demolished.

Swent: What did it look like?

Krauss: Well, it was a beautiful structure. Actually, it was constructed out of brick that they must have hauled up there by mule train and locally-cut pumice stone. A two-story structure with what must have been a big front porch on it at one time that had tumbled down, but the stone and brick work was still totally intact. And then as you progress on up to the site and come into the old Manhattan mine site, the remnants of over a hundred years of mercury production at the Manhattan mine were clearly evident. The old Knox furnace was still standing at that time. Bill Wilder had an operating mercury furnace and retort where he was processing batteries as well as occasionally processing ore. Bill had accumulated over the years tons of surplus equipment, including a whole string of aluminum buses that he used for workshops and storage buildings and sheds. He had a mobile home for an office as one drove into the site; and then Homestake had, beyond that, further into the site, a trailer set up for the geologists who were then doing--I think we had fourteen rigs drilling at the time, twenty-four hours a day, and had hired half the geology department from Chico State [University] to sit on the rigs and to collect the core and log the rock as it was harvested.

Swent: Who had made that connection?

Krauss: I guess--I don't know, it would have been Don Gustafson, or one of the people working for Don and Jim [Anderson]. Greg Brasel was on that crew. He later became one of our ore-control geologists, and then subsequently a foreman for the mining operations. There were probably twenty-five or thirty geologists all camping in an old hunting shack called the Correa hunting shack down on the western slopes below the Manhattan mine. It was really quite a wild operation; I'm not sure that a company would do it that way again [laughter], but all these guys were camping out there and they had hired a cook and she would drive into town everyday and come back with a pickup truck load of--steaks and beer, I think, was their major sustenance.

And Bill Wilder had a generator, an electrical generator on site, a diesel generator, and he had strung wires through the bushes. There weren't any telephone poles; there were wires running through the bushes that plugged in this hunting shack, and they had the TV running and three or four refrigerators running, and it was kind of like a submarine. I think when you went on to day shift you would roll up your sleeping bag and the graveyard shift would come in and take over your bunk. And they had an old --the previous owner had made a kind of a handmade swimming hole, that had been rock-lined and they had filled it with water. So they would come back after their shift and jump into this swimming pool and drink their beer and recover for the next--.

I can't imagine--I guess MSHA doesn't cover exploration sites because I think they would have had a thing or two to say about it.

Swent: I had never heard any of this. That's very interesting.

Krauss: It was an exciting time, and of course everybody was excited about the core they were seeing, and comparing geologic notes, and trying to make sense of it. All those samples were being shipped off to Reno to our lab for processing, for splitting, and assay. All that data was coming back to Napa, where Irma Taylor, who I think we mentioned in the last interview, was sitting there inputting the data into the computer model.

Swent: You mentioned the Correa hunting shack.

Krauss: I think there were 120 acres that we purchased--he had been the current owner from whom we had purchased those parcels.

Swent: And this was right there at the mine site?

Krauss: It was just west of the mine site, between the mine site and Hunting Creek. Serpentine soils--the guy was trying to plant vineyard on serpentine soils, and was failing miserably at it. So I think he was happy to be able to sell the parcel and move on.

Swent: And Wilder was still doing his battery reprocessing at that time?

Krauss: He was still running his kiln, his retort, periodically, and of course Homestake had contracted with him to provide support services for the exploration operation. And he had his mine crew --Billy Wilder (Bill, Jr.), and Rick, and a number of others--dragging plastic pipe all over the site. They were piping water to each of the drill sites for drilling purposes and running wires all over the site to wire up whatever facilities we needed, and keeping the roads open. They were having a wonderful time. I think they were trying to persuade us all they were suffering from mercury poisoning, and they would climb into the back of their pick-up trucks and howl like coyotes as they drove around the site [laughter]. And until you sat down with them and talked to them, you were not always clear that they were normal human beings. So I think they enjoyed putting people on [deceiving people] in that regard.

Swent: The power source was Bill's generator?

Krauss: Bill's generator--no power to the site, no telephone to the site.

Swent: How was Irma Taylor's data getting back up to the people at the mine?

Krauss: Well, they were actually hauling physically--the data itself was brought back on paper. I don't think we even had computers on the site. In fact, I'm sure we didn't.

Swent: So people were driving those reports--

Krauss: Paper records coming back. They compiled the data and generated the maps--made cross-sections, and dragged them back up for drilling decisions.

Swent: In this crowded little trailer, I suppose?

Krauss: Yes. And Jim Anderson was a stickler for very detailed summary reports of all that data, so it was all compiled onto cross-sections and maps on a very frequent basis.

Swent: Interesting contrast of kind of primitive situations and sophisticated demands.

Krauss: Yes. Well, very quickly we installed a microwave link for telephone communication and that certainly increased the flow of information and data. And it wasn't long after that that the team of people doing baseline studies and environmental studies increased and we had quite a--and we began bringing regulators to the site to get them familiar with the site. I think it became a more professional-appearing operation pretty quickly with the advent of those new requirements.

Swent: How did you feel about it when you first saw it?

Krauss: Oh, I thought it was exciting; certainly from an environmental standpoint, because the site had been so dramatically disturbed historically, it was obviously an opportunity for an environmental improvement. Not only had the site been mined without benefit of any reclamation--and in our subsequent baseline study we found substantial concentrations of mercury downstream in the watersheds and in the surrounding soils from the fallout from the plumes--but it had been grazed without any enlightened grazing practice. I think they would bring the cattle up and turn them loose and come back in a year and harvest the survivors. It was badly overgrazed; it was remote enough so that people were poaching it continually, and off-road vehicles were using it.

True or not, the rumors were that some of the old mercury workings had been occupied by the Zodiac killer. And to this day, one zone of the ore body is referred to as the "Zodiac" in reference to that possibility.

Swent: Bill Wilder mentioned that he had named that the Zodiac--

Krauss: Was that his? Okay, I was wondering who was responsible. Yes, they claimed they found cots and cut-out newspaper articles and Coleman lanterns, and sterno stoves--it's certainly a possible linkage.

Swent: It was a very isolated area.

Krauss: Truly, truly. And there were other illegal activities going on in the area such as marijuana production and--really, despite the fact that it appeared to be remote and pristine, it had been ecologically totally turned upside down: all of the oak woodlands were cut for fuel for the retorts; all of the grasses were no longer native grasses, but European exotics introduced by grazing; and there was a tremendous amount of erosion as a consequence of overgrazing.

Swent: How does the grazing introduce--contribute to the introduction of exotics?

Krauss: Well, with the introduction of cattle by the Spaniards, they brought European grass seeds with them, inadvertently or intentionally, I don't know.

Swent: In the feed?

Krauss: In the feed in all likelihood, and under grazing pressure, those grasses out-compete the local natives. And so they very rapidly spread. So when one looks at California grassland, in all likelihood it's not native California grass, even though that's what grows there naturally. That's one of the arguments that we have in the reclamation business: should we be required as a part of our reclamation plan to restore native California grasses? There's always a tendency to say, "Yes, you must use native species, not exotic species."

Swent: But how far back do you go?

Krauss: Yes, exactly. And if you were to plant strictly California native grasses would they survive the competition from just windblown seed from surrounding pasture land? So it's an ongoing debate.

Swent: And I suppose this is--maybe we should wait with this question, but that was one of the questions that I wanted to ask you, was how you determined what baseline you wanted to work from.

Krauss: Well, we can talk about that in context of reclamation and site management, but basically the goal was a stable, productive, self-sustaining ecosystem; a natural system that would perpetuate itself without continued human intervention and support.

Swent: So when you saw this, it was encouraging in that there was no place to go but up? Is that it? [laughter]

Krauss: It certainly, yes, helped my conscience at the time. I was still debating with myself whether or not it was an environmentally appropriate role to play, and it certainly eased my conscience to know that we had lots of opportunities to bring environmental enhancement to that landscape.

Swent: You felt like rolling up your sleeves and getting to work on it.

Krauss: Well, and it provided an opportunity to persuade the community that we had--we could in fact, bring environmental improvement as a consequence of the mine. And certainly the technical people--the regulatory people that we worked with--recognized and acknowledged that, and communicated that on to their decision-makers and the public.

Swent: So when you first met up with Bob [Ackwright], what was his role?

Krauss: I think he was general manager before Jack.

Swent: He didn't stay on.

Krauss: He didn't stay on. Jack replaced him, and I'm not sure what the circumstances were there. I think, you know, it was a time when changes were occurring here. Bill Humphrey joined Homestake, and there were plans to transfer the project from the exploration side of the company to the production side of the company at the completion of the feasibility report. And so Bill was consulted in those hiring decisions, and that may have related to that change.

Swent: And your authority was what? How clearly delineated was this?

Krauss: Well, when I first came on board I was part of the--I reported to Dave Crouch, and Dave was part of the team working--really on the exploration side of the company; developing the permits and the environmental baseline and the preliminary feasibility information prior to the turnover of the project to the operation side of the company.

Swent: And what was the permit situation then? These things that were going on up there at the mine--some of them, I gather, might not have been--

Krauss: Well, there were--yes. Obviously, mining was novel in this region. And the regulatory agencies did not expect a major gold mine to pop up in their backyards, and, in fact, certainly Napa County didn't even have a mining ordinance at the time even though the state law requiring counties to have SMARA--Surface Mining and Reclamation Act--ordinances was passed in 1975. And we had to assist them in preparing and adopting that ordinance. So to that extent, I think there were a lot of activities that were ongoing that had not been subject to public hearing and permit. Although, I guess you could argue that if they didn't have an ordinance you didn't have to have a permit. And certainly a lot of the activities were conducted on already-disturbed ground and existing road systems, and didn't involve significant new disturbance that would require reclamation, which is the point of the reclamation law. In fact, I think Napa County was suspicious that we were not even conducting mining exploration; they had just gone through a politically controversial adoption of the geothermal ordinance, in anticipation of geothermal development extending south from Sonoma County and Lake County into the Mount St. Helena area.

Swent: This is the Geysers?

Krauss: The Geysers steam field, right. And Jim Hickey once told me that he was suspicious that, in fact, that we were doing geothermal exploration under the guise of doing mineral exploration simply because they had a geothermal ordinance but they didn't have a mining ordinance, and we could do the same kind of geological studies, claiming we were looking for minerals, even though, in truth, we were looking for geothermal. But once he investigated the company and understood that it was, in fact, a long-established mining concern, he no longer harbored those doubts. But I think that his staff felt that way for a while, initially.

As the project progressed, we moved into Yolo County, and Yolo County's only ordinance was regulating mining for sand and gravel mining from Cache Creek, so they didn't really have an ordinance that was applicable. And I'm sure that--I don't think even Lake County had an ordinance at that time that regulated mining, although we didn't get into mineral exploration in Lake County, though we were doing hydrogeological studies for waste unit siting and feasibility studies that involved building of roads and drilling and other ground disturbance. But the permitting authorities, the regulatory authorities were all in flux at the time. Napa County was in the midst of a controversy over the development of agricultural lands. And I believe the Farm Bureau had sued the county, claiming that their general plan was insufficient, and sought an injunction blocking issuance of any permits county-wide and that would have affected our project.

As it turned out, the proponent of the suit was a former colleague of mine in the Sonoma County Planning Department, so we sat down and talked it through, and they agreed that they were only really concerned about the Napa Valley and not the remote areas of Napa County. And they restructured their suit to exclude those areas outside of the Napa Valley. So we avoided that bullet.

Swent: So that was one of the constructive things that you were able to do.

Krauss: Having contacts with the local community helped us in a number of regards--yes, that was certainly one of them. Lake County was in the midst of adopting a new general plan, and Yolo County was going through some local area planning that could have affected the area. So all of the regulatory context was in flux at the time that we entered into discussions with them.

Swent: I guess we should say, when you drove up to visit, that you went from Napa County over into Yolo County. And back into Napa County.

Krauss: Well, the primary activity at the time was in Napa County.

Swent: Right, the Manhattan Mine was in this little piece of Napa County that juts up.

Krauss: Although there was some exploration drilling over the ridge in Yolo County, and we really hadn't yet expanded our sites into Lake County, we were just acknowledging that the size of the ore body was greater than we could accommodate limiting the activities to Napa County. I think the earlier hope was that we would only need to deal with Napa and Yolo Counties; and when it became obvious that we needed a bigger tailing site and there wasn't enough flat ground around for the plant site and other things, and that we would need to expand into Lake County, then very quickly we expanded our baseline studies to include those areas as well.

Exceeding Contradictory Requirements

Swent: It's hard looking back from this long time; it's fifteen years now to look back, but I'm trying to get a sense of how the initiative came on some of these things and maybe you can't even sort it out. There were so many things going on.

Krauss: Well, it was an iterative process. It was an interesting team effort that--a lot of pieces of the puzzle--it's like a jigsaw puzzle, and for a while you work on the sky, and for a while you work on the water, and the real substance of the puzzle doesn't make itself apparent until a lot of the pieces are assembled. But we were working very closely with the counties to prepare the way for the permitting effort. And there was this interaction between our work with the regulators to move forward the permitting and our technical people to develop the information necessary for the permitting and also necessary for our own engineering planning and feasibility studies. So--

Swent: The metallurgy was still being developed; you didn't know at that time that you were going to have the autoclave?

Krauss: No, that was a decision that had not yet been finalized, though I think the momentum was very strong there.

Swent: You had to get up to speed, I guess a lot of things there you weren't familiar with--

Krauss: Oh, I learned a lot--[laughter]

Swent: You knew about the gravel mining--that you knew about.

Krauss: I learned so much so fast; it was a wonderful experience.

Swent: How did you go about--

Krauss: I just picked everybody's brain that I ran into. I would go off to Denver for a meeting and I would corner Richard Kunter, John Turney, or Bob Previdi, and Mike Attaway and just ask my questions. To everybody's credit, they were very patient and more than willing to share their information. There was nobody looking down at me because of the naïveté of my questions. It was a very reinforcing experience.

I think that--it was kind of interesting--there was some frustration from the engineering side that the permitting circumstance was not as black-and-white as they would have preferred. So they would ask me a question about--well, what are the requirements for thus and so? And it's like, what are the requirements for the size of sediment ponds? Well, there are two requirements. The first requirement is a prescriptive requirement: did it contain the volume of the 10-year 24-hour storm; and the second requirement is that any discharge from the sediment pound not degrade the downstream water quality. The two are contradictory because the 10-year 24-hour storm sediment pond is not sufficient to prevent degradation of downstream water. I would say, first of all we need to do a review of the meteorological data to determine what the amount and frequency of rainfall is in the area. There were no weather stations in the area, so we had to interpolate from Capay Valley and Mount St. Helena. And then we have to make a business judgment as to how much risk do we want to absorb--risk a violation of the nondegradation requirement. Ultimately, we chose to build sediment ponds of a greater capacity than the prescriptive requirement that the law demanded. So we built 100-year 24-hour storm capacities rather than 10-year 24-hour storm capacities, in order to maintain an acceptable level of risk of non-compliance to the company.

Swent: This was a decision that you could make?

Krauss: It was not a decision that I made myself; it was a decision that I participated in making, and ultimately it was a judgment that I think Jack [Thompson] and John Ransone and Rex Guinivere and Bill Humphrey and perhaps Harry [Conger] had to make, although I don't know that it ever got to his level. But we were all clearly working under the directive that we needed to be sure that we complied with all state, federal, and local law. I think there was a sense that we needed to be reasonably conservative in our environmental design in order to protect the investment of the company in this facility; to build a $250- or $300-million facility only to have it shut down for environmental noncompliance is not serving our stockholders very well. So I think there was a general willingness to look at risk, and look at regulation, and to make a choice based on our best business interest rather than strictly following the letter of the law. And in fact, I think, had we simply strictly followed the letter of the law, we probably would have gotten into substantial legal problems, environmental problems, liability problems. I made that statement at an EPA conference once, after giving a slide show and a case study of the McLaughlin mine--somebody stood up and said, "Well, you did a good job, but you only did it because the regulators forced you to do it."

And I said, "No, if I had done simply what the regulators forced me to do I would be in jail today." [laughter] And they were outraged; they thought that was sacrilege. So we went through some of the examples of the prescriptive standards in the law, and if one simply followed the letter of the law, violations of water quality and air quality could have occurred would have resulted in potential criminal liability.

Swent: I don't follow that. You have to explain that for me.

Krauss: Really there are two parts of the law: one are performance standards; the water--you have to measure the quality of the water downstream of your site, and in California, and really anywhere today, it cannot be degraded from either its historical quality, or its upstream quality; and then the other half of the law is that you must build your facilities according to these engineered standards. If you simply applied the engineered standards that they prescribed, they would not be sufficient to achieve the performance standard for water quality downstream of the site.

Swent: So, one part of the law doesn't fulfill the requirements of the other--

Krauss: Right. And it's not surprising because regulation really lags the science and the technology that's evolved by industry. The regulators don't make tailings ponds, they don't make sediment ponds. All they do is watch the ones that fail and then revise the laws accordingly. So there's always--there's inevitably a lag in the regulations over the cutting-edge of the state-of-the-art practice in the industry. And that was particularly true in our case, because there had been no major mining projects in California in many, many years. So--

Napa County, Lead Agency for Issuing Permits

Swent: So your first acquaintance--let's start then with the permitting--you had to go to the Napa County Planning Commission. Is that where you started?

Krauss: Well, we--yes, we started with Napa County because that's where the original work had occurred and--

Swent: Were you already acquainted with those people?

Krauss: Yes. I had worked with their environmental staff in developing the guidelines for the implementation of the California Environmental Quality Act that had extended to private projects in the beginning of 1972. We had a group of local planners that would meet--

Swent: You had mentioned the North Bay Environmental Planners Group that you had had before.

Krauss: Yes, we would meet regularly and try to understand the dictates coming from the state resources agency and how we were supposed to implement this law, and to develop procedures that were consistent among the different jurisdictions for implementing the law. Steve Rae, who was the senior environmental planner for Napa County at the time, and also a member of the Native Plant Society, had already become very actively interested in the sensitive plant issues at the mine site. And in fact, during my hiring interview with Dave Crouch, Bob Reveles, and Don Gustafson, they questioned me at length about Steve Rae and what his attitude was toward sensitive plants, and how well I knew him, and whether or not we could converse on the matter. So, I think that--certainly my familiarity with the local people was acknowledged in my hiring for the position, and benefitted us over the time.

We sat down with Napa and agreed with them that they should be the lead agency in the local permitting because they had the bulk of the project at the point, and we felt comfortable doing that because they were also professionally the more sophisticated of the three counties. But it was obvious that anything that we did with Napa County we had to also do with Yolo County and Lake County; and we needed to coordinate their activities in order not to have to do them three times in each case. So the second task really, after helping Napa adopt a surface mining and reclamation ordinance, was to work with the three counties to enter into a memorandum of understanding, an MOU, in which they agreed to coordinate the development of the environmental documents required by law, both state and federal law, for the permitting of the project.

Swent: I had a question about this: I had thought that this was something novel--when I first got into this project myself, I thought that it was a novel thing for the three counties to cooperate. But then I got the impression that actually it's in the regulations. That in this sort of case, one county had to be named to lead agency and--

Krauss: Well, there is a--with regard to both reclamation law and environmental law--there is a provision that one can seek a determination from the state of a single lead agency.

Swent: It's not required?

Krauss: It's not required, and in actuality, in my experience, it's politically disastrous to invoke that requirement; to try and persuade Yolo County and Lake County to accept, for their permitting purposes, an environmental document where they had no participation in its preparation is out of the question politically. There's just too much pride in local control to allow that to occur effectively--

Swent: And yet you were able to do it.

Krauss: Well, we did, but only because we created a coordinating committee among all three counties and they all participated; even though it was nominally a Napa County lead agency document, each step of the process was concurred in by all three counties and the Bureau of Land Management.

Swent: So who did--who had the authority to say, "Napa County will be the lead agency?"

Krauss: Well, the State Resources Agency did, but we never had to ask them to make that determination because we persuaded Yolo and Lake to agree that Napa would be the lead agency.

Swent: How did you do that?

Krauss: Well, each for their own different reasons. In Yolo County, they acknowledged that the bulk of the project was not in their jurisdiction, and that they wouldn't really have a strong claim on being--

Swent: Now who is they? The Planning Commission?

Krauss: Well, ultimately the board of supervisors makes those decisions, and we had consulted with each of the board members and planning directors--

Swent: How did you go about that?

Krauss: Called them up and had a meeting.

Swent: Talked to them?

Krauss: Sure.

Swent: So was this one of the first things you did?

Krauss: Well, even before I started, there had been good communication between the exploration group, and Don Gustafson, and Dave [Crouch], and Bob [Reveles] with the three counties. They had adopted the view that there should be no surprises to the local agencies. So, prior to the public announcement of the find in 1980, which was a year before I came on board, the county boards of supervisors had been advised that we were about to make that public announcement and we did, in fact, think that we wanted to work with them to develop this gold mine.

And again, prior to the second public announcement in 1981, I think Dave went to one county, and Bob to another, and Don to the third and said, "Today, we're going to make a public announcement, and we wanted you to know in advance, so that if you had any questions you could ask them." So we weren't strangers. And when it became time to permit, we developed this proposal for a memorandum of understanding--we discussed it with the planning directors in each of the three counties--what did they think was acceptable from their administrative standpoint and from their political standpoint? And once we had their concurrence, then we went and we talked to the individual supervisors and said, this is the way we and your planning directors propose to coordinate these activities; do you see this as being acceptable? And once all of them felt it was acceptable, then it was formally introduced to each of the three boards for their vote and approval.

And that, in and of itself, became a pattern for the way that we related to the counties. I used to tell people we never wanted to go into a meeting if we don't know what the outcome would be. You never want to ask the planning commission to vote unless you can count a majority in your favor, [laughter] and if you can't count a clear majority in your favor then you have got more work to do before you allow that meeting to proceed. I think that was always true for everything that we did--almost all of the votes on the local level were unanimous; very few were not. Occasionally, Yolo County would go four-one, but the bulk of the Lake County and Napa County decisions were all unanimous.

The Environmental Data Advisory Committee and Incremental Approval

Swent: You mentioned Jim Hickey's suspicions, but were there any other pitfalls in Napa?

Krauss: Not really. No. We had--Dennis Goldstein, from our corporate legal office, had developed an excellent rapport with the county council. We worked closely with the planning director, and the county council, and the public works director, and the county administrator. In each of the counties those were the primary players in managing the county's business. I think all of them looked forward to the tax revenues that the project would generate, and all of them felt comfortable, very quickly, that Homestake was a responsible company and would do right by them. There was never really any suspicion that somehow we were a fly-by-night operation that was going to take advantage of the circumstance. Once the MOU was adopted by the three counties, it established a coordinating committee that consisted of the planning director from each of the three counties and the member of the board of supervisors from each of the three counties that represented the portion of the county where the mine was located. And it also included the district manager of the Bureau of Land Management, and a second member of the BLM.

Swent: We should have those names if you can--

Krauss: Yes. If would have been--from Lake County, at that time, it was originally--John Thayer was the planning director, and Richard Day was the supervisor. Of course, during the course of these things--

Swent: It changed.

Krauss: --we had to educate multiple players in these roles. I think, before we got our final permits in Lake County, we were on our third planning director. In Yolo County, Ben Hulse was the planning director, and he was a former colleague of mine also from Sonoma County. He had been on our general plan team, and we worked together for three or four years. And Twyla Thompson was the supervisor who represented our district. Twyla was certainly a very wise and helpful influence on the process. Then of course, Jim Hickey in Napa County, and Harold Moskowite was the representative of the board of supervisors. And on the BLM side, Dan Manning was the district manager in the Ukiah District at that time.

There again, I think we had two, perhaps, three changes in that position over the course of the permit, but Dan was the original district manager. He brought with him a variety of different staff members, but John Foster was his primary designee to participate on the staff level. John was a landscape architect, and largely concerned about reclamation issues. But BLM also had on its staff a range of professionals--they had professional archaeologists, and range scientists, and botanists--so as different issues came up, Dan would bring different members of his staff with him to deal with those particular issues.

Swent: Did d'Apollonia get in on this part of it at all?

Krauss: The original intent--the original purpose that we established for this coordinating committee was to coordinate the development of the baseline data. In fact it was called the EDAC--the Environmental Data Advisory Committee--and d'Apollonia was the prime contractor to organize the collection of that data.

Swent: They had been selected long before--

Krauss: They had already embarked upon that task. But we went back and pulled forward their programs for each segment of the data: This is the work that we propose to do on rare plants; this is the work we propose to do on soils; this is the work we propose to do on wildlife. We asked the Environmental Data Advisory Committee to approve the work program for the work that d'Apollonia or their sub-contractors would conduct. Then, when d'Apollonia completed that work program, they would bring back a preliminary report of the collected data; and they would make a presentation to the Environmental Data Advisory Committee, and the committee would be asked to accept that report--to acknowledge its sufficiency. I don't think there was any precedent for doing that, but in effect, what we were doing was providing an opportunity for them to commit themselves, incrementally, to the ultimate approval of the project.

So that once they said, yes, you've collected adequate background data on wildlife, they couldn't, during the course of a subsequent hearing on issuance of the permit say, well, we can't issue your permit because your wildlife data is not sufficient. So, we kind of, I don't want to say led them by the nose, but there was an element of that; there was an incremental process in which they gradually bought into the project. We worked with all of the regulators in that same way. Even the water boards and the air boards--we worked with the staff--we would provide them with the work program for the waste site selection studies: These are the criteria we'll use in determining if this site is, or is not acceptable. Are these criteria the right ones? And they'd say, well, maybe you ought to add this, or add that to the list. Then we would come back, okay, here are the sites we evaluated, here's our application of this list of criteria to these sites. These are the ones that we've excluded; these are the ones we want to continue to study. Have we done this acceptably? And they would say, sure.

Okay, here's our next work program. Now we're going to do subsurface exploration on these four primary sites. These are the studies we intend to conduct. We're going to drill these holes, we're going to conduct these permeability studies, we're going to do this geological mapping. Is this going to provide adequate data for your regulatory purposes? And we would adjust the work program to achieve their concurrence, then we would conduct it, and then we would bring back the studies: here are the results of that study, and this looks like it's our primary site for these reasons. Do you agree? So by the time we got to the point of saying we would like a permit to use the site for a tailings pond, they had committed to each of the elements of that approval. It was very easy for them to offer the final approval. And the other thing that it did: it made them feel that they were doing their jobs; they were actually contributing to the decisions that were made along the way that shaped and determined the final project on the landscape.

Swent: Could you give an example of any things which they actually changed?

Krauss: Not much. No, really--I don't think so. I don't think anybody from the regulatory community ever caused us to do something that we hadn't originally proposed to do. I would guess that the only exception to that was in the detailed engineering approvals from the Division of Safety of Dams on our freshwater reservoir dam. A different philosophy was employed in permitting that.

Swent: That was another agency?

Krauss: Different agency--and that was a delegated task that Davy McKee [construction management contractors] managed. Maybe we could defer the further discussion of that because it's an interesting contrast to see the way that the permitting of the tailings dam by SRK [Steffen Robertson & Kirsten] and Don Poulter proceeded with the Division of Safety of Dams and the permitting of the water dam. Beginning with two different permitting philosophies and resulting in two different outcomes.

Swent: You laid it out then, consciously? Was this a conscious thing on your part?

Krauss: Yes. And really, it sounds a bit Machiavellian, but it wasn't so much that as just my view of how--I had been a regulator for ten years and the problems that I had with, particularly resource projects, would be coming into the loop too late in the project to have input when it was appropriate. Geothermal--PG&E would come in with the plans for a power plant in the Geysers and they would have already completed their detailed engineering. They would have spent three, four, five million dollars on engineering--this is the civil engineering we're going to do, here's the road access, here's the foundations we're going to build. And you would say, well, gee, did you look for archaeological sites before?

"Oh, we forgot to do all that." Well, the law says we have to look for archaeological sites, and so immediately it was an antagonistic process because in order to adjust their design to accommodate an archaeological site, should one occur, they would have to spend a great deal of money. Rather than do that, they would prefer to fight about it with the regulators.

Swent: So you were doing now what you would have liked to have done?

Krauss: Sure. Bring the regulators into the process when your decisions are still fluid enough that there's no extraordinary expense in making adjustments; so that their input is considered at each level of decision-making as you go from the very general to the very precise; so that by the time you get to the precise, there are no surprises. It's the "no surprises" rule. Everybody's in concurrence by the time you've spent your five million dollars on detailed engineering, and you don't have to go back and spend a quarter of a million changing a road or changing a location or adjusting something. It's really just common sense. But there is--even today there continues to be a tendency in industry to say, well, we'll design our project and you guys just accept it and approve it. Obviously, that's the challenge to a regulator; it psychologically diminishes the importance of their role, and depending on how badly they feel about it, [laughter] maybe if it diminishes the person too greatly, they can become a terrible obstacle in your process. It just made good sense all the way around.

Locating the Waste Disposal Site to Protect Water, Air, and Plants

Krauss: At the same time, we had to work with a range of technical people to develop the data that we needed not only for our own planning, but for the permitting. We've spoken a little about waste site selection studies; as the ore body--as the exploration continued to increase the size of the ore body--we kept expanding the scope of our search for suitable waste rock disposal sites and tailings disposal sites. We worked with SRK from the Denver office--Steffen Robertson & Kirsten. I think the project manager at that time was John Welch, and working with him were a couple of other engineers: Ian Hutchinson was the hydrologist working with them then, and Don Poulter was the civil engineer working with them then, and they had a geologist and a couple of other staff people. We did a survey of the area within a ten-mile radius of the ore body, looking for suitable tailings disposal sites.

We identified, I don't recall precisely now, I think it was thirty-four potential sites that might serve as tailings disposal sites, and then conducted a fatal-flaw analysis of those sites to see which ones would have some obvious impediment to their use for that purpose, and eliminated them from consideration; prioritized the remaining sites, and started doing subsurface investigation on those to determine what their permeability, and what their geology, and what their stability were; gradually narrowed it down to primary sites for waste disposal. This, of course, had to be coordinated with our land department, because we didn't always own the sites that we wanted to use, and some of the sites had potentially conflicting uses--tailings sites and freshwater reservoir sites often have the same characteristics, and you need two, not one, and you can't do them both in the same place. Our freshwater reservoir site was, in fact, one of our potential tailings sites.

Of course, our land department was still negotiating with the Kauffman family--we didn't even know whether or not we could acquire the site at all. So again, it was an iterative process with a lot of different players. And we had to pursue alternatives--maintain alternatives as viable alternatives quite a long time into the process just because of those uncertainties. Waste rock sites were a bit more limited in that the economics limit you to the immediate proximity to the ore body, but again, we could have thrown it over the hill in Yolo County, or hauled it over the hill into Napa County. It's sitting on top of the ridge; we had at least two alternatives. Again, SRK did the technical studies for their site selection. Ian Hutchinson, in his role as hydrologist, did quite a little bit of work on water balance--not only process water and water supply and tailings siting, but also storm water management; the calculating the volumes of runoff from the active areas. We very quickly developed the criteria that we wanted to operate a fail-safe, zero-discharge facility--that we wanted to have--

Swent: Was that an option?

Krauss: Well, certainly a zero discharge was required for process waters--for tailings waters--both the Federal and State Clean Water Acts prohibit the release of tailings to downstream watersheds. Storm water management was another question, and this predated the federal Clean Water Act storm water provisions. But when we looked at the sensitivity of the downstream watersheds, and the water users, and the potential for accidental release or non-compliance resulting from storm water running through low-grade ore piles, or waste dumps, we agreed we needed to make containment systems that would prevent release--potentially prevent release from those areas into the downstream watershed. And, in effect, we anticipated the revisions to the Clean Water Act that instituted storm water standards. When all the rest of our colleagues in the mining industry were scrambling around, trying to accommodate storm water containment requirements, we were already in compliance, so it didn't entail any further cost or any other management measures to remain in compliance.

Swent: When was that huge rainfall that--

Krauss: Well, we had a number of them over the years. The first one was the January of 1986. We had completed our construction in '85, and we were suffering through that first operating season because we had very little water in our freshwater reservoir. We had to put in a supplement pumping system to pump water from the deepest part of the reservoir to the site where the pumps normally would take water out of the reservoir, and build a cofferdam around the pump, and pump the water into that cofferdam and pump it up the hill. In five or six days in January, the reservoir went from seven or eight hundred acre-feet to its full capacity of 6,000 acre-feet. It was a remarkable storm. We did overtop one of our main sediment ponds at that time, the M-1 sediment pond, even though it was designed for the hundred-year twenty-four-hour storm.

Swent: You had it.

Krauss: We exceeded that capacity and had to discharge into the downstream watershed, but it was not judged a technical violation because it didn't in any way damage the downstream ecology. Fortunately, we had conducted sufficient historic monitoring to be able to demonstrate that.

Swent: You had to prove that.

Krauss: We did have to prove that. But there was no non-compliance action ever taken on that. And subsequently, we adjusted our pumping capacity so that we were able to avoid that occurrence in subsequent years.

We also technically had to develop air quality models for the dust emissions in particular. We worked with Kirk Winges, who was then with a group called ERT--Earth Resources Technology, or something like that--who subsequently moved on to other consulting firms, I think TRC, and then he formed his own company. But Kirk had developed a proprietary model that predicted the distribution of particulate emissions from mining activities. The existing models used for that were primarily gas-dispersion models, which tended to greatly exaggerate the predictions of the dust generation and deposition because they didn't adequately account for the fact that particulates have weight and drop out more proximately to their source than other contaminants. So Kirk developed, based on our baseline meteorological studies and our emissions predictions from the operating plans--he developed a model that predicted the air quality impacts surrounding the mining site.

Swent: This would be from blasting, primarily?

Krauss: Blasting, loading, hauling, dumping. All of those activities that result in air emissions. I think the law that was most controversial was the generation of dust from traffic on the haulroads. The EPA had a set formula that had to be applied in predicting the amount and rates of air emissions, and we argued that they weren't well tested or proven. We were able to persuade them that Kirk's model more accurately predicted the rate of generating emissions from those kinds of activities. He did an excellent job for us, and it was a good thing because the air permit was the only one that--one of the only ones, I think, that was actually appealed to their hearing board.

The Capay Valley folks ultimately appealed the issuance of the Bay Area Air Quality permit, and challenged it on the basis that it did not use an appropriate model, and underestimated the emissions. We actually prevailed in the appeal, I don't think it actually went to the final vote in appeal, there was a settlement conference, and peculiarly, in the settlement conference, we actually ended up with a much more liberal permit than the one that had originally been proposed by the staff. I don't think the folks from Capay Valley ever really understood that. But it certainly turned out in our favor.

Part of that was an argument of where our point of compliance was, and normally the point of compliance is the closest point of public access. Of course, we had the Knoxville-Berryessa road running right between the mine pit and the waste dumps; and if we were to have to meet air quality standards at the road, it would have been difficult, if not impossible. We argued that nobody in his right mind would park his car for twenty-four consecutive hours [laughter] on the public road between the mine and the waste dumps, and therefore that shouldn't necessarily be a point of compliance.

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Krauss: The district agreed, on appeal, that the public road was not, in fact, a point of compliance and that it was our boundary line with the adjacent BLM properties. Consequently, we had no difficulty in meeting the federal and state standards for dust exposure.

Swent: And this is actually more liberal than you had anticipated--

Krauss: Than the staff had originally approved, yes. And I don't know that they ever really caught on.

Swent: The staff being? The Napa County?

Krauss: No, this was the Bay Area Air Quality Management District. The appeal certainly benefitted us, not the folks from Capay Valley.

In the conduct of the baseline studies, one of the original efforts was to document the botany of the area, and it was immediately apparent that because of the serpentine soils, we had a wide range of serpentine-indigenous rare plants. Ultimately, it was determined they were candidate species; they weren't actually listed as either federally-determined rare and endangered, or state-determined rare and endangered plants. But the local Native Plant Society had a great deal of concern about disturbance of any of these plants and under the California Environmental Quality Act, we had an obligation to acknowledge, and to the maximum extent feasible, protect these plants from disturbance.

Again, these were decisions made before I came on board, but I think they were very helpful decisions. D'Apollonia had acquired the services of Bill Davilla from Biosystems to conduct our botanical surveys of rare plants, and Bill was an active member of the California Native Plant Society. He immediately contacted the folks in the Napa chapter of the Native Plant Society, and availed himself of the botanical records of the Pacific Union College at Angwin and at UC Berkeley, and the personal records that the Napa chapter of the Native Plant Society had accumulated for the distribution of serpentine-indigenous rare plants in that area.

When you looked at the original compilation of the data, the known data, it was very interesting that these plants tended to cluster along public roads [laughter] which suggested that the sampling--that the study areas were proximal to public roads, and not uniformly distributed around the landscape. But it also suggested that perhaps these plants weren't as unique and rare as might have been supposed. So we undertook an expanded study of the distribution of these plants and actually determined that they weren't that rare and endangered. The local Native Plant Society was just ecstatic, because all of a sudden they had 35,000 acres of landscape surveyed for these plants, and they had one of the most comprehensive databases on the distribution of serpentine plants anywhere in the world--

Swent: Thanks to you.

Krauss: --which they could take off to their annual meeting, and share with their colleagues. We did make every effort to avoid populations of endangered plants as we located our facilities. Obviously, some things are easier to adjust than others; particularly roads and pipelines. We were able to avoid disturbance of sensitive plant sites. Tailings ponds and waste dumps are a little harder to shove around the landscape; though even on the waste dump, we reconfigured the footprint of the waste dump to avoid a population of thelypodium brachycarpum that the Native Plant Society was particularly concerned about. In doing so, we have established a very positive relationship--an enduring relationship with them. They've been active participants in our annual monitoring of sensitive plant populations, and they are very quick to stand up and say, "Yes, Homestake moved their waste dump to avoid the thelypodium."

The reclamation planning was interesting too.

Planning the Reclamation

Swent: And this had to be done as part of your EIS, didn't it?

Krauss: Yes. It was actually part of the project description. Under California law, you need to have an approved reclamation plan before you initiate mining.

Swent: Wasn't this a law at that time?

Krauss: Well, yes. The law passed in '75; it was originally implemented in '76.

Swent: I didn't realize it was that old.

Krauss: I served on the State Mining Board from '78 to '81 and had been involved in developing some of the original guidelines for reclamation planning in California. It wasn't that novel--it hadn't been applied, except in sand and gravel--so we were one of the first to do a reclamation plan of that scale for a totally new major project. I know when I joined the company--early on I visited our Pitch uranium operation and Phil Barnes was there at the time doing reclamation plot test closure studies. They were doing revegetation studies on reclaimed waste dumps, though I understand we have subsequently had to go back and do a comprehensive closure plan for the site. It wasn't totally novel to the company.

Swent: Why did you get off the board in 1981?

Krauss: I resigned from the board to join Homestake. There's a specific prohibition in the law saying that a board member cannot represent a mining company before any permitting agency.

Swent: Conflict of interest, obviously.

Krauss: Yes, and then I was reappointed to the board in 1992 by [Governor] Pete Wilson, and have served on it since.

Swent: I know you were on it for a number of years--so you were able to go back on in '92? You were no longer requesting permits?

Krauss: Right. Yes, my staff now appears before regulatory agencies, and we don't have any--

Swent: So for ten years you were not on the board?

Krauss: Right, from '81 to '92. And boy, did they screw things up! [laughter] I'm still trying to undo all the things they screwed up in those ten years. No, that's only facetious. But there were some things that got very messed up during that time.

Swent: What sorts of things?

Krauss: Well, in the absence of any real clear leadership from the Department of Conservation, their staff and bureaucracy gradually expanded the purview of the reclamation law to overlap into operation--things that are otherwise controlled by air quality permits, or water quality permits, or local land-use permits. So they created an overlap and a duplication that often results in conflict. So the state will come in and say to the mining company, you must do thus and so, and the local agency says, no, we want you do it some other way, and the law was pretty clear that the reclamation law applied to reclamation and the conduct of the mining operation was authorized by the land-use permits under the planning authority of the local agency. By confusing the two, they've created quite a bit of headache for the mining industry.

Swent: Can you give an example?

Krauss: Oh, some of the biggest conflict has been on sand and gravel operations and in-stream mining; where the state says that the extraction--the reclamation of an extraction site that occurs in a stream can only be accomplished by restricting the amount of gravel removed. So they say we have to regulate the nature of the mining project in order to assure its reclamation. The local agencies will say, wait a minute, these guys have a vested right to remove these gravels from the stream and we cannot infringe upon that vested right. Regardless of its reclamation consequence, we can either buy their right to continue to mine, or we can negotiate some sort of a deal with them where they will relinquish their vested right, but we can't simply approve a reclamation plan that says they can't mine any more. That has certainly been where the most contention is.

Swent: Was there any problem at McLaughlin?

Krauss: No. There again, I don't think any requirements of the reclamation law in any way modified or exceeded what we proposed ourselves, or what made good sense from our standpoint.

Swent: So you were planning that with d'Apollonia at the very beginning?

Krauss: Yes. Fundamentally, we went through an interesting exercise with the Environmental Data Advisory Committee and Homestake management to select a post-mining land-use, which is the starting premise of any reclamation plan. We inventoried the whole range of potential uses; we talked about--donating the site to the counties for public recreation and parks, and returning it to ranch land, or developing it as a Palm Springs housing development, Palm Springs-type resort.

Swent: Golf course and all?

Krauss: Golf course and swimming and all. And one of the alternatives we proposed was to use it as a research facility for environmental studies for the University of California system. Our evaluation of the alternatives really involved looking at what assets would remain at the site at the conclusion of mining. When you do that analysis, one of the things that jumps right out is the accumulated scientific data--the baseline data starting with aerial photography and topographic mapping, and mapping of soils, and soil types, and soil depths, and soil capabilities, and site hydrology, and vegetation and wildlife communities and habitats, and baseline water quality, and all of the meteorological data that we had to collect and continue to monitor for our permit compliance requirements. And all of our ongoing monitoring data--we continue to do--we now have fifteen years of aquatic ecology data on all of the surrounding streams and on the freshwater reservoir and succession data on the plant communities and the reclaimed areas. When you look at all that accumulated information, it has a tremendous educational value well beyond any benefit for Homestake, for our requirements to meet our permit requirements, and our monitoring requirements.

We met, here in San Francisco, with our Homestake management and evaluated those alternatives. I think it was really Bill Humphrey that was most intrigued with the idea of the educational facility, and for a variety of reasons. Certainly none of us knew then that as we mined out this deposit that we would meet such a definitive boundary of the deposit. I think there was an assumption that, like most deposits, it would gradually grade into country rock, and we would always have a residual mining potential. If the price of gold went up to 2,000 bucks an ounce, we might well re-mine that site. So Bill was very concerned that we not propose a reclamation use that would preclude future mining. And I can remember him saying, "Boy, if we turn that into a park, all those people that recreate up there are going to refuse us the opportunity to go back and re-mine it. We don't want to do that."

But I think also, there was an acknowledgment that this idea of an educational facility was a selling point in the permitting process to the environmental community and to the local community. Certainly Napa County was very supportive of it. I can remember Jim Hickey in a public hearing saying: "These guys are going to leave one big hole in Napa County, and this educational facility is a reasonable compensation for that un-back-filled mine pit." So it served that purpose. From our standpoint, it also involved a minimum of additional cost--we did not have to create recreational facilities; we did not to have to install new infrastructure. It was a convenient solution from an economic standpoint.

Swent: I suppose a good tax advantage too?

Krauss: Well, there's not a lot of residual property tax value there, but yes, sure. As an educational facility, it will be exempt from property tax, and that will be--I don't know, maybe a couple of hundred thousand dollars a year saved by the company over--

Swent: Of course, this might have been a negative as far as Napa County was concerned.

Krauss: Well, I think Napa is a wealthy enough county that they're not counting their pennies quite as closely as Lake County, or Yolo County. The idea of a permanent educational facility and wildlife preserve was very attractive to Napa County. We did take all of the alternatives to the Environmental Data Advisory Committee and discussed them all. And Yolo County was very quick to concur with Bill's view that they didn't want recreation because they were concerned that creating a recreational site would incur demands for public services that they could not afford--that they would have to improve the quality of the roads to the site and they would have to provide sheriff's patrols, and they would have to provide emergency response for injuries. It was a very expensive proposition, and they certainly didn't want to see recreation, and in fact, in our Yolo County permits, we're required to maintain it as a private site, and exclude the public from access to it. So we have to maintain fences and patrol, and exclude the public. It was interesting.

Swent: What was Lake County's attitude?

Krauss: Lake County was very much intrigued with the idea that the educational facility would provide some continuing employment--albeit it was at a much lower level than the mine. They were also very positive, so that very quickly became the preferred alternative. Then, of course, the reclamation plan proceeded to look at the physical management of the site--the availability of soils for capping and closing the waste dumps--and we inventoried all of the soils that we needed to reserve and stockpile. Perhaps one of the innovative aspects of the reclamation plan is the salvage of the soil from the Davis Creek reservoir site. All of that soil was stripped and stockpiled outside the reservoir margin, and is now being used in waste dump closure and mine area reclamation.

Swent: How far are you having to move it?

Krauss: It's a considerable distance; probably two and half, three miles. Yes, it's a significant commitment to reclamation. And we had certainly looked to alternatives to that. We tried to do revegetation on growth media--non-topsoil areas where you take the geologic materials that are most heavily weathered and oxidized, and supplement them with fertilizers and organic matter. But ultimately, there's just no substitute for Mother Nature's topsoil. The supplements very quickly deplete, and it takes many, many, many years to generate the same humus content that occurs in a deep soil. We've had excellent reclamation success, in part because of the use of the topsoil. Similarly, the topsoil in the tailings site was stripped and stockpiled, and we've since begun doing test closure studies on tailings sites, and it looks like that will work very well also. We're looking at reclaiming the tailings site as a large wetland, using the soil as a cap, and allowing it to seasonally fill with water.

Swent: There will still be a pond?

Krauss: It will be a pond. There will be a permanent pool in the middle of it, and various progressive areas of wetland around it, with grassland at the farther margin, and then periodically inundated areas around, like vernal pools, and then marshy swampy areas around that, and then a permanent pool in the middle. So, it will be kind of a gradation of types of wetland from permanent water to grassland. Our test plots look very good; it has turned out very nicely.

So those are kind of the pieces of the puzzle. We assembled them all into a set of documents that became the permit documents for the project. Again, this was something that hadn't been done before that I know of; the agencies were quite surprised to see a comprehensive set of documents of all the information relevant to the permits. Historically, people would cut it into pieces, and just give the air quality information to the air quality districts, and just give the water quality information to the water quality districts. I think that it was well-received because it gave them a clear overview of the project in total rather than trying to imagine the rest of the project, based on one piece of it.

We accumulated what we call the Project Description and Environmental Assessment. We actually went the extra step of not just describing what it is was that we proposed on the landscape, but actually documenting the environmental analysis we had gone through and the alternatives that we had considered and rejected, and the environmental rationale that we had used in coming up with this particular project design, and our own assessment of what the environmental consequences of the project would be. We elaborated a list of those things that were incorporating into the project to mitigate those environmental impacts. It was essentially our own environmental document--our own EIR/EIS.

Swent: Is this a public record?

Krauss: Oh, yes. It's all over the libraries. Still--

Swent: So you gave it out to each of these agencies?

Krauss: Yes, we had whole truckloads of them--I spent a long time hauling them around to each of the agencies, and then we put them in all of the local libraries for the public to review; and we provided copies to the local Sierra Club, and Native Plant Society--anybody that had interest. You got four big volumes--the project description and the environmental assessment--that included the project description and reclamation plan, a summary of the environmental data, and then this environmental impact analysis. And then a three-volume compilation of all of our environmental baseline data, beginning with soils and geology, and geochemistry of the waste, and geochemistry of the ore, and geochemistry of the tailings.

Swent: Wonderful source material for all sorts of things.

Krauss: Oh, yes. That's the backbone of this whole educational facility concept. Actually, it also provided the database for our habitat management planning that we did subsequently. It's probably one of the best-studied 10,000-acre pieces of ground in the world. Then the next step, of course, was for the counties and federal government to agree upon an independent third-party contractor to do their environmental analysis under the National Environmental Policy Act and the California Environmental Quality Act. They needed to do a NEPA/CEQA document--an EIS/EIR--and the compilation that we had done was to provide the basis for that: that under the law, they were required to hire a consultant who would make an independent judgment on the adequacy of that data, and the accuracy of those conclusions, and venture their own conclusions with regard to the environmental impacts and the appropriate mitigations. The three counties and the BLM worked together soliciting proposals. At that point, they actually hired, at our expense, a coordinator; a guy by the name of Jim Goodfellow who scheduled their meetings, and kept their minutes, and set their agendas.

Swent: "They" is still EDAC?

Krauss: This is still EDAC, yes. Though it was, in effect, Napa County. He was housed in Napa County, and reported to Jim Hickey.

Swent: He was there for several years, wasn't he?

Krauss: He was there, yes, from late 1981 through the end of '84. Towards the end of the process, he tried to institutionalize his role as the coordinator for all of the future monitoring. He wanted Homestake to hire him permanently, and house him in Napa County, and let him conduct all of the environmental monitoring--which resulted in a bit of a squabble. The counties finally acknowledged that this was not a viable way to proceed. Actually, by that point, by the time the environmental approvals had been completed and we started doing the individual permits, the counties went their separate ways. They were more than happy to coordinate on the development of the environmental documents, but when it came time to actually approving the permits and establishing their conditions for our operations, they insisted on doing that independently. And I think that was in our benefit as well.

They solicited proposals from a bunch of consulting firms, and these firms came in before the EDAC committee and presented and defended their proposals. There was a selection made of a firm called Engineering Science, using their established Berkeley office. We delivered to them all of the documents, and the references to all the preparers of the documents, so that they could work with the original consultants and scientists who had accumulated the data. And they set forth to undertake the task of preparing a third-party EIR/EIS. That process began in October of '82. Actually, it was one of the quickest on record in the state --I think the final EIR came out of the process in July of '83, which was a fairly short period for a major EIR/EIS. But that only occurred because the preparation was so comprehensive. We essentially put the final document in their hands, and all they had to do was review and validate it and reproduce it under their own auspices.

Swent: And you got that done within a year after you came on board? That's pretty amazing.

Krauss: Well, we began the submittal a year and half after I came aboard. But there was a lot of momentum there--it was a team effort. Dennis was pushing all the water quality permits, and Dave almost single-handedly did all of the air quality work, and I was dealing with the local counties and BLM and the use permits and reclamation planning. So, yes, it was definitely a team effort. It's much too big a task for any one person to keep all the strings going at one time.

Swent: But you were the one that was holding them all--

Krauss: Well, I was trying to tie them all together into a knot, I think, yes. I tell people I used to have this terrible dream where there would be this faceless Greek chorus of thousands, and I was trying to make them all nod their heads up and down at the same time. But I think that's very descriptive of what we were trying to accomplish--we needed to get all of these multiple regulators and decision-makers to give us a positive go-ahead on a timely basis. We had some surprises in the EIR/EIS preparation. I think between the time the EDAC committee selected the consultant, and the time they actually put the team to work on it, there were some changes in personnel. The people actually doing the work were much younger and less experienced, and less qualified than the people that had been listed in the original proposal.

Swent: Is that the Engineering Science?

Krauss: Engineering Science. We had a--I guess a formidable education task is the best way to describe it. And it was very delicate because it is required in the law that there be an independent third-party judgment, but on the other hand, none of the staff that they were dealing with had any background or experience in mining. At one point we actually lobbied the counties and the companies to employ some more experienced people. Dave Crouch and I went out to Denver and met with their parent company, Parsons Engineering, and said, you guys really need to put some gray hairs on this project, or you as the owner of Engineering Science are going to end up embarrassed in this process. And they did so. They brought in two or three mining engineers. We did have the opportunity to review a preliminary draft--an administrative draft of the EIR/EIS, and copies were circulated to the entire company task force as well as the EDAC members for their review.

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Krauss: We provided Engineering Science with a lot of comments on the draft. They took our project description. I guess in those days we didn't give it to them on disk, so they had to retype it, and they had their group of experts who did an independent confirmation of the baseline data. They did enough double-checking of the data to satisfy themselves that it was scientifically defendable.

Swent: When you saw the preliminary draft, what happened?

Krauss: Well, there were some obvious problems with it. It proposed some changes in the project that we didn't think were acceptable, and some of its analysis was simply not accurate. It projected substantial impacts in excess of what we felt were realistic, and consequently, it suggested imposing limits or mitigations on the project that we didn't want to deal with.

Swent: Can you be more specific?

Krauss: It talked about the potential to pollute the downstream watershed in a way that we thought was excessive. They talked about _if_ the tailings dam would fail, this would be the consequence. In their defense, there is a presumption in the environmental law that one has to evaluate the worst-case scenario. But on the other hand, when one goes through all of the engineering that's required in California to build a dam, the worst case scenario really isn't the failure of that dam. It's such a conservative set of engineering requirements that I don't think it's a realistic disclosure to the public to suggest that the dam might fail and all of the tailings would end up in the downstream watershed.

So a lot of it was editorial rather than factual. Rather than saying, _if_ the tailings dam failed, the water impacts would be thus and so, you can look at other scenarios which are more realistic, such as seepage or leakage or partial release--which is a more realistic scenario. But it was mostly things like that. A lot of their team was unfamiliar with the local biology. They had assumed that the local streams had significant fisheries. They're all seasonal streams that dry up in the summertime, and the only fish that you ever find are the little minnows, the Sacramento sucker and the California roach, that occur in those kinds of seasonal streams. There are no trout spawning beds.

Their biologists had proposed a range of mitigations--they wanted us to plant food plots for the displaced deer. We were supposed to go out and cultivate corn for the deer to eat. Things that made no ecological sense; to create those kind of food dependencies. I don't know if he had learned it in college somewhere and applied it. But mostly things like that--unrealistic, inexperienced suggestions and mitigations and requirements, or what we felt were overinflated disclosures of potential worst-case impacts. But once they brought some more matured scientists onto the team, they were, I think, able to moderate those opinions.

It was one thing for us to stand up and say, no, that's not realistic--failure of the tailings dam is not a realistic scenario; but when they brought in their own mining engineer and civil engineer who said, no, failure of the tailings dam is not a realistic scenario, they were willing to listen to it. So the second draft was much better; that was the one that went into public review. Then began a whole series of public hearings. And again, rather than just allowing Napa County to conduct those hearings as lead agency, we agreed that the document would go to public hearing at each of the three counties; that all the counties would have the opportunity to hold public hearings, and to present comment, and all those comments would be responded to in the final EIR/EIS.

Stubbing Our Toe with the Solano Irrigation District

Krauss: It was at the Lake County public hearings that we first stubbed our toe with the Solano Irrigation District. The Napa County hearings were pretty noncontroversial until the folks from Yolo County showed up and insisted that Napa wasn't doing their job. But when we went up to Lake County, there was a court reporter sitting there with her little keyboard, making a transcript of the proceedings.

Dennis asked me, "Did you hire a court reporter?"

And I said, "No. Did you?"

And he said, "No."

So we went and we asked the Lake County Council, "Did you hire a court reporter to transcribe these proceedings?"

And he said, "No, I thought you guys did."

So we went over and asked her, "Who is it that you're working for?" And she gave us the name of an attorney by the name of Paul Menasian.

Dennis found his way out to the phone and called Paul and said, "Who's your client and what's your concern and can we get together and meet on this?" And he said his client was the Solano Irrigation District, and they were concerned with cyanide as a potential contaminant in their watershed--a threat to their water supply.

Swent: Brice Bledsoe said, when I talked to him, that the first time he became involved in this was at a meeting in Woodland in 1981, with the Yolo Engineering and Planning Group. I don't know that you were there--

Krauss: No, I don't recall that meeting.

Swent: Betsy Marchand had called him--his first awareness of all of this McLaughlin--

Krauss: Was from Betsy?

Swent: --project and the Manhattan mine project was from Betsy. She called him.

Krauss: Did he say when that occurred?

Swent: Well, before this meeting in Woodland in '81. She called him and told him that this was happening and that he should be aware of it, and he was surprised that he hadn't been notified, and that he was unaware of this mining development up there. And so then he went to a meeting in Woodland in '81 of the Yolo Engineering and Planning--I don't know if it's "commission" or "committee" or what--

Krauss: I'm not sure what Brice is referring to.

Swent: --and then he went to some meetings in Napa. Then ultimately, what he said--now this is a direct quote: "Under private litigation, and major opposition at the regional board (that's the water quality control board), they decided to have meetings in San Francisco with the major clients of Homestake." So that was later, but he went to some meeting in Woodland and--

Krauss: Well, the first time we became aware of their concern was through this Lake County court reporter. And Paul Menasian was employed by the Solano Irrigation District, and had been directed to investigate what this thing was about, and gather information on it.

Swent: It's interesting they sent a court reporter out as a representative to sit in on the meeting.

Krauss: Well, if there's some potential that you may want to enter into litigation, you need to have a transcript. If there's not a transcript being prepared, then it's your obligation to do it. Obviously, it was a wake-up call for us, because if there's somebody spending the money to acquire a transcript--a legal transcript of the hearing--then they must have a significant concern, or at least some dollars in support of their concern.

Swent: So then you decided you had to talk to--

Krauss: Well, we did talk to Brice after that. And we were in discussion with them when we went back to Napa for a subsequent hearing. At that hearing I think the Solano Irrigation District--this was on the environmental document--the Solano Irrigation District represented--it was probably Brice at the time--stood up and said that they felt that they hadn't had adequate time to review the technical details of the project and they requested that the Napa Planning Commission continue the process for a period of a month or two to give them enough time to do that. I was very concerned because, in my experience, once a decision on a project is deferred, then it becomes easy for subsequent deferrals to delay it indefinitely; and obviously we were anxious to keep the thing on schedule.

So we asked that they take a break--we took a lunch break actually, and assembled in a motel in Napa with Brice. He was representing, really, one of the water users from the water district who used the water in a consumer product where their market was potentially threatened if anyone could allege that the water quality had been compromised. So we had representatives of the water user, and of the irrigation district, and of Homestake, and we all sat around and said, what is it that you need?

Swent: The user was actually there too?

Krauss: Yes, by the time we got back to Napa, Morrison and Foerster was representing them. A guy by the name of Kim--I have to look at my notes.

Swent: Morrison and Foerster is a legal firm in San Francisco?

Krauss: Yes. They said that their concern was that the public would perceive that the quality of their product was compromised as a consequence of the project going forward in that watershed.

Swent: You said they had actually received a threat of a boycott?

Krauss: Well, there had been at least one call that had gone to them, saying that they were going to tell the world that cyanide was in their product, and obviously nobody would buy it then. I was subsequently told that had been a call made by one of our opponents in the Capay Valley. For some reason, he didn't persist on the effort. I suspect had he persisted, it would have become a much more significant obstacle to us then it ultimately was. But we were able to agree among ourselves, the Solano Irrigation District, and their water user, that we would work with them to develop sufficient monitoring, and other assurances to protect their interest; in return for which they agreed that they would not delay our proceedings. After lunch, we reassembled at the hearing in Napa County, and they publicly stated to the Napa Planning Commission that they were satisfied that the proceedings could continue on schedule without continuance, and that they agreed to meet independently with Homestake, and work out any problems.

Swent: So this was an actual hearing of--

Krauss: This was in the conduct of a hearing on the draft environmental impact report.

Swent: Not one of the public informational meetings you had called?

Krauss: No. Then the meeting that you mentioned that Brice referred to here in San Francisco proceeded. The Solano Irrigation District hired a group of environmental consultants to review all of our engineering and environmental documents; they were called Public Resource Advocates or something like that. Primarily a group of professors from Stanford. At the same time, we actually had two levels of meetings. Literally two levels: on one floor, the technical scientists were meeting; and on the next floor, the attorneys were meeting headed by Bill Langston and Denny Goldstein and, I think, Clem Shute assisted us in those negotiations. And Morrison and Foerster--it was in their offices that we met. I wasn't party to the legal discussions so I don't know what ultimately transpired there, but there was a negotiated indemnity. We actually entered into a legal agreement where we agreed that--and the original indemnity was pretty strict. It said should the sale of their product diminish as a consequence of a real or perceived release of contaminants from our site, that we would indemnify them for any losses.

Swent: That word "perceived" could be very--

Krauss: Yes, that was really scary. But it was Bill's judgment at the time that that was the best deal that he could cut with them. Dennis and I subsequently negotiated, about three years later after we had developed a good working relationship and some confidence with them, change to that agreement, wherein it had to be a real impact on the quality of the water delivered to their facility; as opposed to a perceived impact on the quality of their product.

Swent: So that's still in effect?

Krauss: It's still in effect. But, from a practical standpoint, you could pipe all of the tailings from McLaughlin directly into Lake Berryessa and the quality of the water coming out of the pipe into Solano County would still meet federal drinking water standards. There was never any real threat of contamination or degradation of the water purveyed by the Solano Irrigation District.

Swent: It's just that word "cyanide" that scares people so--

Krauss: Oh, yes, absolutely. The idea that cyanide shows up in a consumer's product is terrifying. And from their standpoint, when you're marketing a product like that, a rumor--and apparently they had suffered sales losses in other regions as a consequence of rumors of contaminants in their product, so they were very sensitive. The technical negotiations very quickly proceeded from the nature of the project and its real threat to the environment--their scientists were persuaded, almost immediately, that there was no real threat to the quality of the water that the Solano Irrigation District was selling; but they remained concerned on behalf of their client that there would be a public perception of a threat. So we started talking about "what can we do to protect you people from this perception?" We proceeded to focus on environmental monitoring, water quality monitoring. It was quite a scramble because they put forward, again, a whole series of hypotheses that had to be disproved: What is the consequence of all of the dust from the mine washing into the watershed on an annual basis? Obviously, there's some mercury in that dust, there's some arsenic in that dust--

Swent: Asbestos?

Krauss: Actually, asbestos was a problem we didn't have because the hydrothermal activity changed the asbestos into a non-asbestos clay.

Swent: But that was one of the words that was going around--

Krauss: It was certainly one of the words that was discussed, yes. So, Kirk Winges got out his models, and he calculated all the worst-case possible dust emissions into the watersheds, and what the consequence would be on water quality. And again, very quickly, it's absolutely infinitesimal. There's absolutely no way that you could generate enough dust in a mining operation that would wash down out of that watershed into a 1.6-million-acre-foot reservoir that would in any way affect the quality of the water. But we did develop with them a comprehensive monitoring plan for water quality. We identified with them where the monitoring stations would be, upstream and downstream.

Swent: This is not the industrial user, this is the Solano Irrigation.

Krauss: This is the group of consultants hired by the Solano Irrigation District. And in the agreement that the lawyers hammered out, we agreed that we would jointly ask the approval agencies to adopt our agreed-upon monitoring plan, which was in effect more stringent and more comprehensive than the water board would have imposed upon us independently of this effort. One of the components of the monitoring was what we call our "continuous monitoring station." We actually have a measure weir and a sampling station downstream of all our activities on Hunting Creek that composite samples on a ten-minute basis, and those composite samples are analyzed for cyanide, so that we can definitively prove that absolutely no cyanide left that site.

Swent: And it goes on for fifty or sixty years?

Krauss: Well, we agreed that we would continue to do post-closure monitoring for up to fifty years or until such time that everyone was satisfied that there was no threat to water quality. Given the level of cooperation that we had--now I have no doubt that it won't proceed for fifty years. In actuality, the monitoring that we agreed to do has turned out to be beneficial to us--it's provided us with a clear ability to defend Homestake from any allegation that we're creating a problem downstream. It's like an insurance policy. I don't think, again, anything that came out of that agreement was--well, with possible exception of the frequency of monitoring; we did have to monitor awfully frequently initially. But even there, because we monitored so frequently in the first few years, we had enough data to provide a statistically valid sample; it would provide a statistically valid database against which to compare future numbers where you could have argued that we didn't have an adequate statistical basis for describing baseline conditions had we not done that. So I don't think it harmed us in any way. But it was certainly the most viable threat to the success of the project. It was kind of ironic that it came from the industrial sector and not from the environmental community. Or at least not directly from the environmental community.

Swent: And one that you hadn't anticipated.

Krauss: Yes. That was probably the single surprise in the permitting process that we had to deal with. But certainly, that first meeting in the motel in Napa was critical. It was over in the

Holiday Inn. I was just adamantly--we have to not delay this process. We cannot lose our momentum, because as soon as we lose our momentum--it was inevitable--that's the request from anybody that opposes the process: continue the hearing, continue the hearing, let us get more information. And the folks from Yolo County were already coming to Napa, saying, we want more time, we want more time, we want more time.

Swent: Well, they did hold it up.

Krauss: Their approval was the last one to go forward, but they did not hold up Napa County's approvals, or Lake County's approvals. And in effect, by delaying their process beyond Napa's and Lake's, it put more political pressure on them to go ahead. It created more leverage for their board.

Swent: They delayed, as I recall, five or six months beyond the others, didn't they?

Krauss: They did. Absolutely. Their allegation was that the environmental document was insufficient because it didn't include the detailed environmental monitoring requirements. Legally, the environmental monitoring requirements are conditions of permits issued after the environmental document is concluded. The EIR/EIS is approved and certified, and then when the water board issues their permit, they tell the applicant what monitoring has to be conducted. And when the air board issues their permit, they include conditions that stipulate the monitoring that is to be performed. Then the operator simply compiles all of the monitoring requirements imposed by each district and that becomes the monitoring plan for the project. But Yolo County said, no, that traditional procedure is not sufficient. We want to know before we approve of the project what all of the monitoring will be. And we, in fact, agreed to hire yet another consultant, Brown and Caldwell, just for Yolo County to review our proposed monitoring plan, and acknowledge its adequacy. That's what actually delayed the approval of their permits.

But in the meantime, Napa approved its permits, I believe in September. The EIR/EIS was certified in July, and they issued their permits in September. Lake County issued permits in September. The water board issued a preliminary permit entitling us to go ahead with the construction. And we mobilized the road construction, and the site preparation for the tailings dam, and the pre-mine stripping, and the site preparation for the grinding area, and actually worked through the winter of 1983 on those projects despite the fact that it rained 19 inches in October. When you mentioned heavy rain storms: we've had a number of notable rainfall, but 19 inches as early as October is unusual in this climate. We were trying to do dirt work, and that much rainfall was difficult but we were successful; and environmentally successful because we had incorporated into all that work very rigorous sediment and erosion control plans. I think we bought every straw bale in northern California making straw bale fences to contain any sediment that might wash off any of those construction sites. Fish and Game actually came out in the middle of that storm when it was at its very worst. They said, gee, the creek looks cleaner with you guys here than before you were here. [laughter] I know Bob Sinclair and the construction people were gratified that they got that positive feedback. But, yes, we had a lot of straw bales around.

Mine Wastes Classified as Non-Hazardous

Swent: Would this be a time to talk about the classification of the tailings?

Krauss: Yes. I think really, yes, we've talked really primarily about the environmental document and the subsequent county approvals of the permit to mine, or the use permit to mine, and the reclamation plan. In addition we needed--of course the BLM independently had to go through their federal process.

Swent: This is because part of the land belonged to BLM?

Krauss: There were portions, yes, portions of the waste dumps were on mill-site claims administered by the Bureau of Land Management; and portions of the mine site were on unpatented claims that were administered by the Bureau of Land Management. So they were required to approve a plan of operations, and the approval of a plan of operations was contingent upon their approval of an Environmental Impact Statement pursuant to NEPA. They had to go through their own public comment process, where they received written comment and responded to written comment, and had to issue a record of decision that was published in the federal register and authorized us to proceed with the project as it effected federal lands. Also, as a part of the project, they had to grant rights of way to the counties for our relocation of the county roads.

Yes, I remember at the last minute, when we wanted to start construction on the Knoxville-Berryessa relocation, the documents had not been executed on the grants of rights of way to Napa County, and it required signatures of both BLM and Napa County. So I chartered a plane, and flew Harry Hamilton, the public works director, to Ukiah. And he and I ran in to Ukiah and signed the documents and got the BLM to sign them and brought them back to

Napa so that we could begin construction. So there were lots of little bits and pieces and details like that.

Swent: Good timing on all these things.

Krauss: Yes. We also needed, in addition to the water board approval, preliminary approval to allow construction, we needed air approvals--air board approvals from each of the three air districts. Then the issue you mention, the characterization of the waste, was another jurisdiction altogether. Under California law, mine wastes were regulated both by the Regional Water Quality Control and state water control boards under the Federal Clean Water Act and the State Porter-Colon Clean Water Act, and also by the State Health Department under the Health and Safety Code, Title 22, as the disposal of and the management of a potentially hazardous waste. Water quality law is both federally generated and state generated, and the federal legislation is the Federal Clean Water Act, and in California, the administration of the Federal Clean Water Act is delegated to the state. So they administer the issuance of what are called NPOES permits.

But also under California Water Quality law, which is the Porter-Colon act--those were the names of the legislators who drafted the thing--the state and regional water boards have to regulate the disposal of waste to land. So the placement of waste rock, and the placement of tailings are regulated under the--

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Krauss: So in addition to the water code, the disposal of mine waste, particularly tailings, was subject to regulation under the health code, which is referred to as Title 22 of the California Code of Regulations. And under the health code, the health code distinguished between hazardous and non-hazardous wastes. The disposal of hazardous waste to land was subject to extraordinary regulation under the health code, and additionally subject to substantial fees and taxes that the state collects to administer their hazardous waste program, and to clean up abandoned hazardous waste sites. So it was important for us to know, as early as possible in the process, whether or not the state would view our tailings as a hazardous waste or a non-hazardous waste. Had we been subject to the hazardous waste regulations we would have to pay multi-million dollar hazardous waste fees annually.

So we worked with a process chemist with CH2M Hill by the name of Jim Mavis to predict the quality of the tailings based on studies of the tailings from our pilot tests from the metallurgical group. The metallurgical group, in testing the efficacy of autoclaves in the production of gold from this ore body, collected data not only on the gold recovery, but also saved for us the pilot tailings. The pilot tailings then were analyzed pursuant to both federal and state waste-characterization tests called waste-extraction tests to see what soluble metals might be released from these wastes. Based on that pilot test data, Jim Mavis developed a technical document concluding that the McLaughlin tailings would not exceed those criteria that would cause it to be defined as a hazardous waste by the State Health Department. We felt that we needed to get them to accept and acknowledge that conclusion before we went forward with the construction of the project because otherwise they could step in--if they concluded otherwise at a later date, they could step in and shut down the project.

We did, in fact, persuade them to acknowledge that conclusion subject to submittal of confirming data based on testing of the actual tails during the operation of the mine. But it was really based on Jim Mavis's work that we satisfied ourselves that that confirming data would be forthcoming; that we weren't at risk, in other words, of having to go back and either pay hazardous waste disposal fees, or provide additional containment facilities for the tailings.

Swent: Was there a point at which you weren't sure how this would come out?

Krauss: Well, you never know until you have your confirming data, but we were highly confident based on the work that Jim Mavis had done; and in fact, the results of the actual testing of the tailings produced were very, very close to what Jim had predicted in his work. The one contaminant that was closest to the threshold of causing the tailings to be classified as hazardous was nickel. What is called the soluble threshold limit concentration, the STLC for nickel is twenty parts per million, and in Jim's estimation we would run very close to that level. And in testing of the tailings, we were running fifteen, sixteen, seventeen, eighteen parts per million consistently. And occasionally, we had an excursion in excess of twenty parts per million. We had enough concern that Dennis and I went to the State Health Services Department and met with them, and in an exchange of correspondence with them, got them to concede that the threshold limit concentration applied on average to the total mass of waste, and that a single exception in a monthly or quarterly test would not cause the whole mass of waste to be reclassified.

Swent: This was naturally occurring nickel up there in the hills?

Krauss: Yes, it's from the serpentine soils. Yes. Subsequently, through the California Mining Association, we were able to exempt mine wastes from regulation under the health code altogether in the same manner that mine wastes are exempted from the federal hazardous waste regulation by the federal Bevel amendment. So, we've since solved that problem definitively in legislation, or at least, so long as the federal law continues to treat mine waste as non-hazardous waste, we're not treated differently in California than the rest of the industry is throughout the country.

Swent: What would be the rationalization for exempting mine lands?

Krauss: Well, hazardous waste law is written primarily for chemical manufacturing on the premise that they're regulating barrels of highly toxic materials. That, historically, had been disposed of in landfills and leaked into watersheds. Whereas mine wastes do have some contaminants such as chromium or nickel or arsenic, they occur in very, very low concentrations in huge volumes--it's a huge-volume low-concentration waste that, although it has some of the characteristics of hazardous waste as measured in analytical chemistry, its behavior in the environment is very different from chemical wastes that are produced in manufacturing processes.

In fact, the state of California legislature commissioned a study by the University of California at Berkeley, looking at mine waste in the state and its impact on the environment and public health. They went back and looked at historic mine wastes as currently regulated and those pre-regulation, and they concluded in every case that mine wastes created a problem, it was an environmental problem related to release to water, and so long as mine wastes were properly regulated with regard to protecting water quality, they would not present a threat to public health. And it was on the basis of that study by UC Berkeley that the legislature then modified the state law to exempt from hazardous waste regulations mine wastes. So it's a practical conclusion based on the environmental consequence of mine waste disposal.

Swent: The Mine Advisory Board pushed this study?

Krauss: No, we don't have any jurisdiction on that. It was purely a legislative determination by the state legislature. The California Mining Association [CMA], the trade association of California mining companies, certainly worked very hard to promote that. And there were mining companies in southern California, mining companies particularly in the industrial mineral sector, who, as a consequence of that legislation, save several million dollars a year each in hazardous waste disposal fees. It was a significant benefit to the industry.

Swent: When did you go on the environmental board of the CMA? When did that start?

Krauss: Well, I chaired the environment committee the last two years. I participated on it really since, I guess, 1985. After the permitting of the mine, I began to have a little bit of time. And construction had started up--after we got through that point, I started going to Sacramento once in a while, attending CMA meetings, and became a member of the environment committee. This is the third year that I've chaired the environment committee.

Swent: But this was all before you were in that?

Krauss: Yes.

Swent: You mentioned something about the federal Bevel amendment?

Krauss: When federal hazardous waste regulation--when RCRA passed, there was an amendment offered that exempted from hazardous waste regulation mine wastes until a scientific study could be performed to determine the environmental impacts of the management of mine wastes. Based on that study, a determination [was] made, whether the mine waste should be regulated under hazardous waste law, or under solid waste law, in the same manner that landfills and municipal waste is regulated. At the conclusion of that study, it was determined that mine waste should be managed as a solid waste under what is called Subtitle D, rather than as a hazardous waste under Subtitle C. For the last fifteen years, so far as I can recall, or longer, the EPA has subsequently been wrestling with developing those regulations that would apply to the disposal of mine wastes, and have yet to conclude the process. In the meantime, the lawyers keep arguing about what is a Bevel-exempt waste--which they call a "beneficiation" waste as opposed to a non-Bevel-exempt or "process" waste--subject to hazardous waste regulations. So, where does one draw the line between processing wastes and benificiation wastes? And unfortunately, you have a lot of lawyers arguing about these things rather than engineers and scientists.

Swent: Meanwhile, you have to comply with something that you don't know is out there.

Krauss: Yes. Absolutely. The company is at risk. Actually, Dave Crouch was very instrumental in the federal determination that mine waste be regulated as solid waste rather than as hazardous waste. I don't know that that's ever been acknowledged, but that one decision has certainly saved the entire mining industry many millions of dollars in waste disposal costs. He headed the National Mining Association--what was then the American Mining Congress--Solid Waste Committee over that period of time in those negotiations. He played a significant role in that determination.

Swent: I'm glad to get that in. I didn't know that.

Krauss: Maybe we could take a little break and re-marshal.

Swent: I think perhaps we should. We've been at this for a long time. This is a good place to stop.

Three Counties with Different Planning Approaches

[Interview 3: October 25, 2000] ##

Swent: We're continuing after nearly four years' hiatus here, and in the meanwhile lots of things have happened. You have been president of the California Mining Association, which I'm sure is a first for an environmentalist to be head of a state mining association, and the McLaughlin Mine has closed down its mining operations.

We're going to go back twenty years and start picking up where we left off. At the time that we stopped, you had talked briefly about the permitting, but I think there was more that you wanted to go back and say about the obtaining of the EIR [environmental impact report] and the EIS [environmental impact study]. Is that a good place to start?

Krauss: Sure, that's a good place to start. I think when we left off, we had talked a bit about the development of the environmental impact report and the various permits and the team approach that we took to obtain those permits with Dave Crouch taking the lead on the air quality permits and Denny Goldstein pursuing the water quality permits, and I was pursuing the county permits and reclamation permits and plan of operations with the Bureau of Land Management.

Really the integrating document that related to all of the permits was the Environmental Impact Report and the Environmental Impact Statement. We talked a bit about the committee that was formed among the three counties and the BLM, called the Environmental Data Advisory Committee [EDAC], and how we worked with them to incrementally accumulate the environmental data, the baseline data, working with them to secure their approval of the work programs before we collected the data and obtain their approval of the work products after the information was collected and presented so that we had in effect an incremental approval of the sections of the environmental report as it was developed. This was an opportunity to kind of get folks to buy into the project as we went forward.

I think at that point I hoped for the ideal--I was kind of hoping that we could do one permit and each of the counties would sign off all on the same permit. We did have one environmental document, and under the California Environmental Quality Act, the act requires that when there are multiple agencies using the same document that one of those agencies be designated as the lead agency. Very early on in the Environmental Data Advisory Committee, there was quite a bit of discussion as to which of the counties should be the lead agency. Both, I think, Lake and Yolo county were very pleased that Napa wanted to be lead agency and they really had the professionalism and expertise and sophistication to play that role.

Certainly also it made logical sense because by far the bulk of the project, at that point in time anyway, was located in Napa County, so they had the most at stake.

Swent: Did you have any input on that decision?

Krauss: I think we encouraged it in that direction.

Swent: How were you able to do that?

Krauss: Well, just in having individual conversations with the participants in the Environmental Data Advisory Committee. I think in all of these matters, either by phone or in person we would discuss these issues one on one in advance of the gathering of the committee. Generally it was pretty clear in my mind what would evolve in the discussion of the committee, based on those one-on-one conversations.

But Lake County was terrified at having to assume that role. They were so short-staffed and so under-funded, and even with our willingness to pay the cost of staffing up to do that, they just didn't have the experience to deal with it.

Swent: And yet some of them were unhappy later, that they didn't have it.

Krauss: Well, I think some of the folks in Yolo County were unhappy. There was really very little rationalization for Yolo being lead agency. The only facility there was the freshwater reservoir, and a small portion of the pit, and the language in CEQA talks about the agency with the largest percentage of the jurisdiction serving as the agency.

Swent: CEQA is the California--

Krauss: California Environmental Quality Act. So under the guidelines by which lead agencies are chosen, Napa was the logical selection. Had any of the counties objected to that, the law provides that they could have appealed that decision to the State Office of Planning and Research. Or perhaps it was the resources agency. But they did have an opportunity to appeal that decision and seek to become a lead agency, and neither Lake nor Yolo chose to do that.

So we were able to prepare a single environmental document that provided the information necessary, the environmental information and the proposed mitigations and the public disclosure of environmental impacts that were required for each of the counties to issue their permits.

And we also were able to work through the Environmental Data Advisory Committee to develop a single reclamation plan. We developed a consensus in that committee about the post-mining land use of the site as an environmental research station, which was an outcome, again, that I was very pleased with. Personally, I had proposed that. I guess I've always had a personal view that the academic world ought to play a more relevant role in resource management activities, and it seemed to me it was an opportunity to get the academic community involved with the project in a positive way, rather than the traditional role they tend to play, which is in opposition to development projects. So it had an underlying political benefit to Homestake as well as a land use that was viewed as beneficial by each of the three counties.

Swent: I was interested in reading--and I don't recall which one of your papers, but in something that you wrote, you said that in dealing with *perceived* objection or perceived--what would be the word?--insult? [laughs], that it would be important to have an outside group and that you thought that the academic institutions were the best outside group to present your interest.

Krauss: It has always been my view that the academic community should be the voice of objectivity, but it's not always the case. However, when they stray from that, particularly in the scientific disciplines, you can always point out where they varied from scientific procedure or discipline. In my experience, they are more than willing to put the train back on the tracks if you can legitimately describe to them how they have misused science and come up with an unsubstantiated conclusion.

Swent: One thing that you have not really mentioned in our earlier interviews was your academic experience here. I don't believe that you had mentioned that you had been teaching at Sonoma State. So those contacts that you already had were very valuable.

Krauss: I did have contacts there at Sonoma State. I taught part time while I was employed by Sonoma County in the planning department, one class each semester, I think for a period of two or three years. One semester I would teach what I called resource management where we would look at the environmental issues accompanying geothermal development and mining and agriculture and forestry. And then the second term I would teach a course in environmental impact analysis: what are the tools, the techniques for predicting environmental change resulting from development projects.

Swent: Of course, the mining at that point I guess was just the gravel mining?

Krauss: It was sand and gravel mining primarily.

Swent: And geothermal--

Krauss: Yes. But it was well received by the students because I was bringing to them real-time, relevant experience, not the yellowed notes that I had taken from some professor in the distant past, so it was exciting.

Swent: At some point, Chico State [University] was brought into the picture, too. Did you have--

Krauss: Chico was brought in by the exploration group. I think almost every geologist at Chico was hired during the exploration drilling. Jim Anderson, I believe, insisted that we have a qualified geologist collecting and logging the core as it was drilled. They had gone up to Chico and recruited students for that period. So I think that was the tie to Chico. And I think Greg Brasel or another one or two of our subsequent geologists and employees did come out of that group, but there has not been an ongoing connection to Chico since that period, so far as I know.

Swent: Was it at this time that you began your connection with Davis?

Krauss: The connection with Davis grew gradually. It started through Bob Matthews, who was in their geology department, who was a colleague of mine on the State Mining and Geology Board and also of Jim Anderson's. Jim had shared with him information about the McLaughlin discovery, and Bob Matthews had visited the site on a number of occasions and had followed it as it developed over time. And he had asked me to provide slide shows and lectures and field trip opportunities to his geology students, so that I think was the initial relationship at UC Davis.

As we moved forward with the permits, we developed a relationship with Charles Goldman in the environmental studies group and employed them to conduct our environmental monitoring in Yolo County on aquatic systems.

Swent: But that came later.

Krauss: That came a little bit later, yes.

I think we were just talking about the fact that we did have a single EIR/EIS that served all of the agencies, and also a single reclamation plan. That included the land use as a university studies facility. But when it came time to obtain the use permits and the conditions on those use permits, each of the counties was very insistent that they act independently. In fact, they really did apply different planning approaches to the approval of the project.

In Lake County, the Lake County planner was a former colleague of mine at Sonoma County by the name of John Graham, a very brilliant planner and a dedicated fisherman. He left Sonoma County and moved to Lake County in order to do bass fishing. He has since retired on disability, I think, and does bass fishing full time. That's his whole life now.

But he developed an approach where the site was zoned to what is called planned development, or planned community development, which is a planning tool normally applied to residential development, but it provided the flexibility within that PD zone to allow the designation of each of the kinds of uses that we wanted to establish in Lake County, so that included the tailings pond and the processing facility and the offices and temporary offices and the university field stations. Each of those could be especially designated within the planned development zone. That avoided the need to necessarily be consistent with an underlying agricultural zone and commercial zone or industrial zone. It was a site-specific designation that permitted those things that we explicitly described.

And then he conditioned all of those on a whole myriad of special plans. They had an erosion control plan, an emergency preparedness plan, and a local hiring plan, each of which required quite a lot of documentation and proof of compliance. So it was a very elaborate, complicated system. Only somebody as brilliant as John could have thought it up and structured it and organized it.

Swent: He was with the county.

Krauss: He was the county planner with Lake County, who was responsible for drafting--

Swent: So was he initiating these things that Homestake had to accept?

Krauss: Yes. It was his choice that that was the way their zoning ordinance would be implemented in the context of our project, and we said, "You're the boss. We'll do it your way."

Napa County was easier. Their zoning district allowed the mining activity and any of its associated facilities within what they called their agricultural and watershed zone. And so we were able to process a conditional use permit within that zoning district that provided us the opportunity to mine.

The one difficulty we had in Napa County was that they had, at the time we started the process, failed to adopt an implementing ordinance for the state Surface Mining and Reclamation Act, so they did not have the local authority to approve a permit to mine or a reclamation plan. As I recall, Denny Goldstein spent quite a little bit of time assisting in the drafting of the Napa County--what's called the SMARA, the Surface Mining and Reclamation Act, the ordinance, in order that we could get the permits we needed to proceed.

Swent: Didn't Yolo need that, too?

Krauss: They had already adopted a surface mining ordinance because of their gravel mining.

Napa at the time was involved in a land-use conflict over the location of commercial activities in their agricultural zones. There was a proposal near Yountville for a motel and a resort and restaurant in what was then zoned as an agricultural zone. The local environmental community brought suit against the county to prohibit the issuance of any development permits on the grounds that their general plan was inadequate. They had sought an injunction or they were about to seek an injunction to prohibit the county from issuing any building permits or rezoning permits or use permits or whatever. It stopped the McLaughlin Mine in its tracks.

Again, it was just really fortunate that the proponent of that lawsuit happened to be the family of one of the planners that I worked with in Sonoma County. He had actually been one of my students at Sonoma State, Ron Taddei. And so he introduced me to his family, and we sat down, and we had a discussion. It was clear to them that they had no intent to frustrate Homestake's project, and they were more than willing to revise their proposal to prohibit construction in the Napa Valley, as opposed to the whole of Napa County. So we got Denny together with their attorney, and they redrafted their request for an injunction, and I believe it was granted. I believe they tied up all permitting in Napa Valley for a period of time.

Swent: There wasn't a problem there with the Williamson Act?

Krauss: That was in Yolo County. None of the properties either in Lake County or in Napa County were subject to Williamson Act contract.

Yolo County had a whole different set of planning issues. The one that comes to mind immediately *is* the Williamson Act. The Williamson Act is a state act that provides that the owner of a property can pay a lower property tax based on its agricultural or open-space value as opposed to its fair-market value, presuming they agree to not develop it for a period of ten years. Yolo County had then and still has, I believe, one of the most extensive Williamson Act programs in the state. They had enrolled a substantial proportion of the county under the terms of the Williamson Act, including portions of the property that Homestake acquired for the Davis Creek reservoir, for our water supply.

Fortunately, the portions of the mine in Yolo County were not included in Williamson Act, so we didn't have to deal with that as an issue. We went to the county, and under the terms of the law, the county can cancel a Williamson Act contract providing that the property owner pays the back taxes that were otherwise relieved under the terms of the act for the prior ten years. We proposed to Yolo County that we wanted to cancel the contract and pay the back taxes and not have to deal with that issue.

The county supervisors and planning department felt very strongly that they did not want to establish a precedent of canceling any such contracts. They didn't want others to feel that they might also be entitled to cancel contracts as a consequence of the precedent they would set in allowing us to cancel ours. They proposed as an alternative that they amend their ordinance that described uses of the land that could be allowed when a piece of land was under Williamson contract, what are called compatible uses, to include freshwater reservoirs, for whatever purpose, including industrial purposes as well as agricultural purposes.

I remember this real clearly because this was the first time that Denny Goldstein and I had a strong difference of opinion. As in most of our differences of opinion, hindsight always proves Dennis right, so--. He's a wonderful prognosticator in that regard. But his view was that we ought to insist that the county cancel the contract, that to do otherwise would be to put us at risk and would be a can of worms.

My view was we gotta make nice with the county and do what they want because if we offend them and insist that they do something they don't want to do, then they're just going to make it that much more difficult for us on subsequent steps of the way.

We had quite a heated argument about it, and suddenly Dennis through up his hands, and he says, "You know, it doesn't really matter what *we* think. It's what our bosses think. And the way this thing works, in *my* view, is that you give your best argument to Jack and I'll give my give my best argument to Jack, and he'll decide which he wants to do, and you and I will live with it."

Swent: This is Jack Thompson.

Krauss: Yes, Jack Thompson. And I really appreciated that whole lecture from Dennis, because it made it possible for us to work very congenially together. We're very good friends to this day. We have had our different points of view on things over the years, but I have learned that--I don't think I can think of any circumstance where in the long run Dennis wasn't right.

Swent: How did this one come out?

Krauss: Well, Jack agreed with me that we should not offend the counties and allow them to proceed in the manner that they wanted to, so their county counsel did prepare an amendment to the Williamson ordinance, identifying reservoirs as a compatible use, and the board of supervisors approved it. Our opponents in Yolo County seized upon that as an opportunity to try and stop the construction of the reservoir.

They were entitled under the law to seek a referendum on the legislative act of amending the ordinance. I guess any legislative act in the county can be subject to a referendum, and there's a procedure where they have to seek a petition, initiate a petition, and they have a set period of time to collect signatures. If they can gather a stated percentage of the people who voted in the last election, then it goes on the ballot, and the decision to adopt that ordinance can be overturned as a consequence of the vote of the people.

Swent: Is this when they rang in all the students?

Krauss: This is when they tried to ring in all the students. Fortunately, at that point we had already established quite a presence on campus through--

Swent: This is at UC Davis.

Krauss: At UC Davis, yes. But Cal-PIRG [California Public Interest Research Group] became involved, and tables were set up, and signatures were sought. Unfortunately, a lot of misinformation was presented. I wish I had the written flyers, but there were allegations that the project would release cyanide into Cache Creek, which was physically impossible because it was in a different watershed entirely. There were some very strong factual, I guess, lies that were represented as being the basis for seeking signatures on the petition.

And there was also a dispute between the folks that promoted the referendum and sought the signatures on the petition, and the county itself, with regard to the start and end date that they were entitled to collect signatures. I don't really remember the details on that, except that it was something that was entirely independent of Homestake's participation. Whatever went on in that regard was strictly a decision of the county officials.

I just made an appearance before the Yolo County Board of Supervisors a couple of weeks ago, and by coincidence the county counsel was receiving his retirement recognition. Charles Mack had been the county counsel in Yolo County for I believe thirty-eight years. He was the longest-tenured county counsel in the state. But he was an excellent attorney, and I'm sure that he would not have allowed them to do something that could have been challenged as being illegal. They may have done something that was untraditional or otherwise unexpected, but it certainly wasn't illegal. I don't believe he would ever have allowed that to occur.

Whatever the case, the petition drive did fall short. It did not succeed in gathering sufficient signatures to put the issue on the ballot. So ultimately the reservoir was approved by Yolo County as a conditional use permit, as a compatible use within the Williamson Act.

Swent: You said you had already established a presence on the campus.

Krauss: At that point, we had done a number of things. In addition to Bob Matthews' classes, we had met a number of other professors who had invited us to provide lectures.

Swent: Who is us?

Krauss: Really, most of the people that did it were either Norm Lehrman, the chief geologist, who had established a relationship with the rest of the people in the geology department or myself, who worked really also in geology but environmental geology: provided lectures on the slope stability and fault and seismic issues that were involved in the engineering and design of the facilities.

We always had lots of extra copies of the various technical reports that we commissioned made and would share those with the professors and their students, as teaching references, so the report calculating the maximum credible earthquake that could be expected in that location--and here's an example of a real calculation on which real structures are going to be built; it's not a theoretical, educational exercise--and again, I think the students responded very well to having real documents to deal with.

And it was about that time that we began to work with Charles Goldman and his role as an independent expert monitoring the aquatic ecology on the site. That did come up, I believe, after that initiative failed.

We did have some interesting experiences in Yolo County hearings.

Swent: You said that Denny would have been right. In hindsight, you think Denny was right?

Krauss: Well, he would have avoided that whole issue had they succeeded in obtaining the sufficient signatures, and then we would have been faced with a public referendum that could have been a huge public relations cost. To argue your side in a countywide election is a substantial diversion of resources and attention, and I don't know how it might have come out. It would have required a huge effort of speeches and lobbying and public statements and meetings and flyers, and would have been very nasty because the folks were already involved in substantial misrepresentations, and it would have further polarized the community, so we were very, very fortunate that they didn't gain sufficient signatures to put it on the ballot. I think it might have killed the project. It certainly would have set it back in terms of schedule.

Swent: If they had canceled the Williamson contract, though, you would have been accused of buying your way out.

Krauss: Oh, sure. It was a no-win for us. I mean, all of those things were no-wins. People who philosophically opposed us were going to attribute base motives to everything Homestake did. It didn't matter. It is always a lose, lose, lose situation. And knowing that, it led to taking a pretty hard-nosed stand with some of those people on some of those issues.

A Dramatic Public Meeting at the Guinda Grange Hall

Krauss: I was starting to talk about the first hearing we had in Yolo County on the Environmental Impact Report. We did agree to hold hearings in each of the three counties, even though we had no legal obligation to do so, to give the citizens of all three counties the opportunity to comment on the environmental document and not just hold those hearings in Napa County, although we could have, under the law, since Napa was the lead agency.

The first hearing we had in Yolo we wanted to have where it was convenient for the local residents, and we made arrangements for that hearing--or the county made the arrangements--the county planning department made the arrangements for that hearing to be held at the Guinda Grange Hall. It turned out to be a substantial setback, and it was really kind of inadvertent. It was one of those circumstances where not all of the elements were under control.

Jim Anderson and the exploration group had previously retained Hill & Knowlton, the San Francisco public relations firm, to film periodically the activities involved in the discovery and development of McLaughlin. Without telling me, they had decided, since they were going to be filming from a helicopter aerial views of the McLaughlin mine site, that they might as well take advantage of the proximity and just pop over the hill and land their helicopter next to the grange hall and unload their equipment and capture some footage of the first public hearing in Yolo County.

Well, this was very much a surprise to the locals as well. All of a sudden, instead of being Jack Thompson and Ray Krauss kind of there in our shirt sleeves discussing with the planning commission their technical questions about what we were going to do and how it was going to work, we had a public presence that we didn't anticipate at all. The helicopter landed, and the kids were all running around, excited. This was the biggest event in Guinda since the end of World War II or whatever. You know, it was just--

Of course, it just put a totally different perspective on who Homestake was. All of a sudden we were a bunch of city slickers with this big public relations firm who were coming into their little community to manipulate the outcome of a public process.

It was just an absolute disaster. And after that--

Swent: Who came?

Krauss: Well, Jim Musselwhite was the employee of Hill & Knowlton, I believe, who orchestrated the event. He had hired a film crew from San Francisco who did all of the filming--actually, who have done quite a lot of excellent work for Homestake. The one piece that we put together, that I think you've seen, the *Meeting the Challenge* film came out of that footage, and some of the footage from that hearing is actually in it. But, boy--and subsequently I sat down with Jack, and Jack agreed that we would not have anything further to do with them and that they would do nothing unless he approved it first, period.

[tape interruption]

Swent: We were interrupted by a phone call from Dean Enderlin up at the mine, I take it?

Krauss: Yes. He wanted to know the disposition of the inundation maps, where to find them.

But anyway, we were talking about the Guinda hearing and the arrival of Hill & Knowlton by helicopter and the filming.

Swent: Were there executives in suits and ties that came?

Krauss: I don't believe so. I think that's probably a euphemism that was used by one of your interviewees. I know that Bill Humphrey--the only other people that were at that hearing were--Jack was there, and Dave Crouch was there, and Bob Reveles was there, and I was there, and Denny was there. There were a bunch of us, but I don't think any of us were wearing--well, I had a jacket on, I guess, a sport coat on. Maybe people did have jackets and ties. That was their habit at that point, so it's not unlikely, though I seem to recall Bob Reveles sitting there in shirt sleeves, but I don't remember about the rest of them.

But the outcome of the hearing was to continue everything. It created enough uncertainty and suspicion in the minds of--Jan Lowrey was then the chairman of the planning commission, and I think had that group not appeared it might well have been a different outcome, but one never knows, of course.

I think they might well have concluded that the EIR was adequate and sufficient and sent that comment back to Napa County and greatly expedited the ultimate Yolo County permitting process, had that group not shown up and changed their perception of who we were and what we were up to. But they did continue the hearing--

Swent: You mean the Hill & Knowlton people who showed up in the helicopter. But the Homestake executives did not come in the helicopter.

Krauss: No. And so far as I know, none of the Homestake folks at the hearing were aware that Hill & Knowlton intended to do that. They certainly had not cleared it with me, and if they had cleared it with anyone else, whoever did clear it did not consult with me because I was caught flatfooted with that. We had to make the best of it.

Swent: It was just television cameras that they brought.

Krauss: They brought lights. They set up television lights. Here you are, in this little country grange hall, and the next thing you know they've got klieg lights or whatever they are all over the place. And they were shooting film, not video, so they had film cameras and soundmen and microphones set up everywhere. I mean, it totally disrupted the flow of the hearing. It became the dominant point of attention in the room. The hearing was no longer the point of attention; it was just the sideshow.

Swent: Had you brought audiovisual stuff, easels and maps and that sort of thing?

Krauss: I think we may have had a quick slide show which showed the site and the facilities and the maps, yes. We had a pretty standard little ten- or twelve-slide illustration of who we were and what we were doing.

Swent: But it was a low-key kind of thing.

Krauss: Yes, it was just an informational thing. It was what they were used to. Most of their public hearings involved either overhead projectors or slides back then. That wasn't unusual.

Swent: That wouldn't have thrown them off.

Krauss: No. But it did open the door to considerable ongoing discussion. By the time we had our second hearing on the environmental impact report--again, an extra hearing that we weren't required to hold in Yolo County--opposition had formed and they had marshaled their troops and come up with the objection that the environmental report was insufficient because it did not describe in detail the environmental monitoring that was to be conducted on the site.

At that point in the development of CEQA, monitoring plans were not a part of an environmental document. The document described what environmental impacts would occur, and then what mitigation should be applied, and then the decisions were made by the permitting agencies, and they would add to their decisions conditions dictating what environmental monitoring was to be performed. So it was the independent judgment of the regulatory agencies that would ultimately designate what environmental monitoring would be required.

It is kind of interesting that in the last five or six years, the Environmental Quality Act has been amended to require that an environmental monitoring program be included in any EIR, so the people weren't irrational in asking for it. It's a logical thing that the environmental monitoring that is to be performed be disclosed to the public and subject to public comment. But it was not part of the process as it was applied at that time.

Subsequently Napa went ahead and certified the EIR and proceeded, and Yolo refused to use that EIR until it was amended to include the complete monitoring plan. They actually required Homestake to provide them with the funds to hire an independent consulting firm to review the adequacy of that monitoring plan, so we had a whole--it's like an EIR of an EIR. It was another whole round of independent review.

It was really treacherous footing because each step of the way the county staff was alleged to have been in Homestake's pocket and paid off, and there were some ugly, ugly accusations against--I felt badly for the people there. Again, I had known the planning director, Ben Hulse; we had been colleagues in Sonoma County. One way or another, I knew practically everybody we had to deal with. They said, "Well, they used to work together, so obviously Ben's in Ray's pocket."

But in Yolo County they actually made the allegation that Homestake had paid off the planning director and the deputy county counsel, which gave them quite a bit of discomfort and which was totally ridiculous. If anybody ever took the high road in a permitting exercise, it was the McLaughlin permitting. There was never any manipulation whatsoever of any public agency.

Three Levels of Water Quality Monitoring in Yolo County

Krauss: But in the course of that, they selected a number of firms and asked them for proposals for reviewing our proposed monitoring plan, and they selected a group called Brown & Caldwell, a reputable, actually national consulting firm with an office in Sacramento. And Brown & Caldwell put together a team of geochemists and water quality experts and aquatic ecology experts, and they each reviewed their piece of the environmental monitoring plan and provided their suggestions for changes or enlargements or more specifications in terms of quality control--all of it pretty good, pretty scientific, actually--and none of it contrary to what we intended to do anyway. I mean, I don't think it would have ended up being any different. It was all just good science.

But it just came at a different point in the sequence. Normally the environmental monitoring would be submitted as a condition of approval, and then the agencies would review it and cause us to adjust it and we would implement it. Here it had to come before the approval.

There were allegations that Brown & Caldwell were somehow not qualified to do it, even though Yolo County selected the group. One of the real interesting difficulties that came out of that was they had a very peculiar view of what ought to be monitoring for impacts on aquatic ecology. They had some young aquatic ecology graduate from, as I recall, from Colorado, and he had no sense whatsoever of the nature of Coast Range fisheries or ecology, and he was proposing stream monitoring that would have typically been employed at a trout fishery in the Rocky Mountains, which makes absolutely no sense in the Coast Range, where the streams dry up every summer and where the dominant fish are California roach and Sacramento suckers, which are little minnows that never grow beyond two inches.

They also had a wildlife biologist that proposed a number of--that was in the EIR. There were a number of wildlife mitigations in the EIR that made no ecological sense. It was kind of the same parallel phenomenon but in a different document.

It was real hard to argue against them. Here they were the independent experts that the county had hired to critique our environmental monitoring plan. So I came up with the scheme of hiring or giving the county money to hire a local expert who did understand coast-stream ecology, and giving that aquatic ecologist, that limnologist, the authority, within certain budget limits to decide what the program would consist of.

I had met Charles Goldman a number of times previously and was aware of his work on Lake Tahoe. He is the aquatic ecologist who has led Lake Tahoe research for several decades now in terms of maintaining the clarity of the lake and preserving the aquatic ecology of the lake and really providing the underlying science that has driven all of the land use controls and their related controversies associated with Lake Tahoe. And he has been nominated for a Nobel Prize. He's an internationally acclaimed expert whose opinions were very hard to challenge.

He also had a lot of interest in taking advantage of the opportunity to gain funding to support additional graduate students, and he saw this as an opportunity to develop another little research program in association with our Davis Creek reservoir. So we agreed to provide a certain level of funding--it was $100,000 a year--for this combination of monitoring of existing conditions and comparing them to baseline conditions, and research money, where they could undertake whatever research studies that they thought were relevant.

They were also in a position to decide what would be monitored, what water samples would be taken, what aquatic organism samples would be taken, how often, from what locations, how they would be analyzed, by whom, at what frequency, for what parameters. The planning commission agreed to that. They thought, well, this is a credible way of resolving what--they could understand our argument that the proposals of Brown &

Caldwell were totally inapplicable to this circumstance, but they were at a loss as to how to fix it.

We really had to come up with a solution to that or it would have proved to be an impasse. So that was the last missing piece that allowed them to agree that the EIR was sufficient. We had a monitoring plan, an independent review of the monitoring plan, and then this aquatic ecology independent expert that would resolve any uncertainties with regard to that element of the monitoring plan.

Swent: I would like to have you clarify the Colorado trout stream versus the coastal creek--I can understand that this one dries up, but what was the problem?

Krauss: They were seeking monitoring that was just inappropriate to this ecological setting. They were asking us to monitor fish on a frequency that made no sense. In order to monitor a coastal stream, you want to monitor it at those periods in the year when you've got benthic organisms alive. It makes no sense to monitor it monthly, for example, when the damn thing is dry for six months of the year. That's an extreme example, but it makes no sense to monitor species or seek to monitor species that aren't present.

Actually, in their recommendations they had omitted monitoring for some of the things, like nickel and chromium, that are present in serpentine soils that you would normally want to look at in the Coast Range, which weren't present in their experience in aquatic systems. So just apples and oranges, out of context.

The resolution of the EIR issues that allowed us to go forward with the consideration of the permits in Yolo County--this brought us to yet another issue, and that was who would sit in judgment of the monitoring results that we submitted to the county each year. For some reason, Yolo County was very unique relative to the others in their distrust for government, even their own government. They were not about to believe that their planning staff could be objective in reviewing the monitoring results and reporting to the planning commission and the Board of Supervisors whether or not we were in compliance, nor were they satisfied that the water board was able to do that, or the Department of Fish and Game was able to do that, or the three regional water boards or any of the three air quality management districts were qualified to do that. Only they were qualified to do that, and therefore they had to have an independent review panel.

Swent: You didn't mention the air, but weren't they also afraid of asbestos in the air?

Krauss: There were a number of issues with regard to the air, asbestos being one of them, and we did monitor for asbestos over the years, and there was never any to speak of--the serpentine formation does have present in portions of it certain asbestos minerals, but in our circumstance the hydrothermal activity that created the ore body also altered the asbestos minerals to montmorillonite clays, so I think we monitored for fifteen years--

Swent: Anyway, how many miles away is it, air miles?

Krauss: It's eight or ten miles upwind. That was part of the problem. The only time the winds blew from the mine to Capay Valley were under storm conditions, when it was wet and there was no dust anyway, so all of these allegations were baseless.

Swent: They were perceptions that you had to deal with.

Krauss: We were always dealing with. It's the nature of the public process, reviewing and approving projects, that the proponent always is put in the position of proving the negative. An opponent can propose any hypothetical consequence, without being required to provide any support for that hypothesis, and then we would have to prove it wrong. That wasn't only true of those people who were philosophically opposed; it was true of some of the folks that should have known better.

In the course of the consultation with the Solano Irrigation District experts, they raised the issue that the dust generated by the mining would have provided significant loading of metals--chromium, nickel, mercury--to degrade Lake Berryessa. We ran the calculations, and we discovered that we could have discharged the entire volume of tailings generated over the twenty-year life of the mine into Lake Berryessa, and it still would not have exceeded drinking water standards, so the quantity of dust and its solubility and its transportability--it was well, well, well below anything that could ever be conceivably measured. And yet we had to hire an engineer and go through those calculations and present them to prove that in fact it could not conceivably occur. Just because somebody thought, "Well, here's an interesting question."

The development of this technical review committee was contentious in Yolo County, just like everything else. It was actually a recommendation of the Brown & Caldwell review of our monitoring plan that the county constitute an independent committee to review the monitoring results, and they had listed six or eight disciplines that ought to be represented on that committee in order that they have adequate expertise to evaluate the data.

The other counties took a different approach. The other counties said, Well, Napa County has been the lead agency in the preparation of the environmental document. Why don't we designate Napa County as the lead agency to review the mine's compliance? And they will receive the monitoring report. We will all receive the monitoring report. If we view there's some difficulty with the mine's compliance, we'll notify Napa County, and Napa County will hold a public hearing, and the public can comment, and Napa County will accumulate the feedback from the water board and the air boards and everybody else, and they will issue an annual report, stating whether or not the mine is in compliance and if not, what needs to be done.

But Yolo County was not about to participate in that process. All of the other agencies did and do to this day participate in that, as their means of reviewing on an annual basis the environmental monitoring data, confirming to the public that the mine remains in compliance with the permit requirements.

The Yolo board established this technical review panel, and then our Capay Valley friends insisted that a panel would not be adequate unless it included public representation, that it wasn't satisfactory just to have a number of experts but that they needed the public to direct the experts in order for it to be adequate.

And I supported the deal. It was apparent from the very beginning that this was a means of satisfying the public opponents that would allow the board to say, Now we've given you what you need; we're going to go ahead and approve the project. It was the essential element to support their approval.

But I insisted that there be limits to what this technical review panel could do. The first was that I insisted that they only have the authority to look at the monitoring that was relevant to Yolo County, that they weren't about to have the authority to comment about what happened in the Berryessa watershed or Lake County air basin. I wasn't going to get them telling the other agencies that they were wrong and forcing the other agencies to defend their conclusions with regard to our compliance. The board really couldn't disagree with that. I mean, they had no jurisdiction outside of their boundaries.

The other thing I insisted on was that their recommendations could not cause the cost of our monitoring to increase over what was the cost of the originally approved program, that they could make recommendations to take money from one part of the program and apply it in another part of the program, but they couldn't simply increase the cost to Homestake on a willy-nilly basis, which is what would have otherwise happened.

And so we were able to prevail in that argument, and the board adopted and ordered those limits on the activity of the technical review panel.

Swent: This is the Yolo---

Krauss: Yolo Board of Supervisors, where it was actually finally decided, yes.

The committee started out with a lot of enthusiasm. The annual environmental monitoring reports--they're twenty-some pounds in four volumes--they're pretty daunting. And even the experts on the board weren't really qualified to understand everything that was in them. Interestingly enough, the predominant information in Yolo County, of course, was the reports that Charles Goldman and his research group produced, which was already an independent effort. It was not information that was produced by Homestake; it was produced by an independent academician.

So we had an independent panel reviewing an independent researcher's independent monitoring of the mine. It bordered on the absurd. Quite a little bit of conflict developed between Goldman and his people and the committee because they were offended by the fact that the people criticizing their work were less qualified than those who conducted the work. So that kind of flavored the discussions all along. There was this kind of: Who are you to tell me that I should be doing something differently?

Of course, each of the members of the technical review panel had their own pet issue, and every time we got a change of members, a whole new body of questions came up. There were a couple of issues that were really kind of dominant. The committee eventually just faded away, but the first issue was the measurement of mercury in fish flesh.

The question came up during the permitting whether or not the freshwater reservoir would create an environment that would promote methylation of mercury and thus enhance the transport of mercury from an insoluble state into the food chain. So we agreed that we would stock the reservoir as a means of providing a monitoring tool to determine whether or not mercury was in fact methylating and being taken up into the food chain.

Dr. Goldman hired a graduate student by the name of Darell Slotton, who has since become a well-renowned regional and even national and international expert in mercury and its fate in the environment, which gave Jack Thompson and some of the rest of our people a bit of consternation because Darell had been one of the students from UC Davis that had shown up in the hearings in opposition to our project.

They really thought I was mad, having proposed this agreement, to give Goldman the independence to hire who he wanted and to report what he wanted and to monitor what he wanted--

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Krauss: They didn't need to worry that Goldman and his people would report conclusions that weren't based in science and if they did, then we would challenge them to apply good science. Ultimately, Darell became one of our best allies because he was perceived by the folks in Capay Valley as being one of them, an opponent of the mine, and when he came back to them and said, "Gee, folks, this reservoir is really providing you a benefit in that the amount of mercury leaving the site has been reduced and the reservoir is improving downstream environmental conditions"--I could have said that until I was blue in the face and nobody would have ever believed me, but when Darell Slotton came and told them that Homestake had improved the ecological conditions in their Cache Creek as a consequence of the reservoir, they had to believe him, so it turned out quite well.

Swent: Who were the people on this review committee? I think we should name them.

Krauss: I would have to go back to my notes. The original ones included--well, the public members were Avery Tindell and John Ceteras.

Swent: Both of whom we have interviewed, so we have their accounts.

Krauss: There was another Goldman who was in there, whom I think your husband knew, who did work in radiation exposure? He certainly knew Langan. We talked about it a number of times. He had done early work on radon. But he was the toxicologist. And there was a housewife/Ph.D. by the name of Turid Reed, who particularly irritated Goldman's team because--

Swent: That is Charles Goldman.

Krauss: Charles Goldman's team, yes, because they felt that she introduced irrelevant considerations. I'm trying to think who the others might have been.

Swent: Well, it's a matter of public record.

Krauss: I would have to go back to my notes. The committee gradually died away, so I have lost track of it in the last ten years.

But the issue of measuring the mercury in fish flesh became contentious because the university wanted to run those analyses themselves, in their own lab, and we encouraged them to do so. In order to assure that their methodology was accurate, they also wanted to have samples run in independent labs, and they also asked that the state Department of Fish and Game run samples in their lab. So they would take a fish and chop it up into pieces and send it off to three different labs and then compare the results when they came back, that fish being a minnow an inch long.

Initially the results were quite dissimilar. Ultimately, it turned out that the labs were using different techniques in the preparation of these samples, in the cutting up of them and dissolving them in acid and creating the fluid for metals analysis. The prep techniques involved taking a certain weight of fish flesh and dissolving it in acid and then analyzing the resultant solution for its metal content. Obviously, the dryness of the fish and its relative dry and wet weight as it is dissolved, and the technique in preparing a sample--. When we're looking at parts per million or parts per billion, as we were in this case, a slight error in dilution or in sample prep can make a huge difference in the results.

Swent: Would it make a difference if you got a piece of liver in?

Krauss: I think they were still debating that. There was some question as to whether metals were concentrated in organs as opposed to flesh, and I think they did try to be consistent in that regard, but it would, yes, if otherwise you didn't separate them.

But, of course, this was more fuel on the fire because Avery was convinced that somebody was manipulating the results. Again, Homestake was the villain, and yet we had nothing to do with any of the labs. They were all three independent labs. We had nothing to do with the catching of the fish, the transport of the fish, the preparation of the fish, the analysis of the fish, or the reporting of the numbers. But the committee spent many, many nights--I drove from the mine to Woodland, and we sat there from seven until midnight and I would drive home at get here at two A.M.

Swent: You had to be there?

Krauss: Oh, yes, we had to be there to defend Homestake's interests. I mean, they were all over the place. Avery in particular would throw crazy allegations at people, and I had to constantly--I think in my review of John's interview, he comments on my being hard as nails or something, but I was constantly interrupting people, saying, "Wait a minute. That's a different county.

That's not your purview. You're wasting our time." Or, "No, you can't propose adding more monitoring unless you make a compensating decrease elsewhere in the program."

"Well, there's nothing we want to decrease."

"Well, then you can't add more expense to Homestake. You don't have that authority."

"Well, you're just being hard-nosed."

"Well, yes. If I'm not hard-nosed with this group, we're going to be all over the landscape."

Another example is at one point the water quality monitoring that was conducted for all of the counties, including Yolo County, involved Homestake personnel taking the samples and sending them to an independent lab for analysis, pursuant to EPA protocols, with appropriate chain of custody and quality control and duplicate samples and split samples and replicate samples and spike samples. There are protocols that are required in such a program that assure that there can never be any manipulation of the data.

I wish I had been bright enough to manipulate the data. It's like cooking a set of books. To make it entirely internally consistent is just beyond human comprehension, even with computers. But there were all these suspicions or allegations raised that somehow Homestake was manipulating the data in order to prove that we were in compliance when in fact everybody knew we couldn't possibly be in compliance.

Swent: You're being sarcastic there, we should say.

Krauss: Yes, I guess so. So at one point we had to change analytical labs. The lab we were using told us that they were going out of business or for some business reason would no longer be available to us. Phil Barnes, who was working for me at the time, spent a huge amount of time meeting with other labs, reviewing their quality control procedures, reviewing their results, reviewing the personnel and their training, reviewing the equipment they had, and the ability to do quality work.

We did in fact employ a new laboratory in Santa Rosa, where the previous one had been in Sacramento. And I think we actually ran sets of samples for three months, three consecutive months to both labs so that we had data from both labs to compare and make sure that the numbers were comparable and there was not some change in the analytical results as a consequence of using a different lab.

But Avery decided that we had moved the lab to Santa Rosa because I lived in Santa Rosa and I could therefore dictate the results. He constantly made that allegation publicly. The board of supervisors--and after a while, people would just roll their eyes and say, "There goes Avery." It was a huge, huge drain on energy and time, with very little benefit or consequence.

There was never, in my recollection, a recommendation for a change in the program that didn't simply repeat something that Charles Goldman and his people had proposed. There was never a recommendation of any consequence that came out of any of those meetings or any of those deliberations or any of those procedures. But they did eat up a lot of time for the first four or five years.

And then it became routine. Boy, by 1989, 1990 we would submit the report--we did an annual report for the monitoring year, from July one of the previous year through June thirty, because that would entail a complete water year, from the fall rains through the winter into the spring. We would compile all that, analyze it all, write it all up, submit it in October, and Napa County would review it and get all its comments and hold its public hearing and decide whether or not it was sufficient by the end of the year, the latest by January.

The Yolo County technical review committee got so far behind that they were reviewing a two-year-old report. We had just submitted the next report before they had completed the review of the previous year's report.

Swent: And Lake County accepted Napa's--

Krauss: Lake County, and Fish and Game, and water board, and the air quality districts. Everybody else dealt with the Napa procedures. It got to be so ridiculous--it was so far behind--that even if they had a relevant recommendation, it was too late to implement it, so--. Most recently the committee has just failed to meet. They just faded away. I've debated with Dean [Enderlin] whether or not we should cause them to meet. We've asked the committee to write a letter to the board saying they're satisfied that everything is okay, and they're not going to meet and prepare reports any more unless they find some exception that causes them to create a report. We've given them a million ways of dealing with it, but I suppose that's good news. The need to review and participate and comment on our activities in Yolo County is zero. And I guess that means that people believe that we're no longer a threat to their well-being. I'm sure they would conclude that that's only true because of their involvement in the process. I'm happy to let them believe that if that's what they want. But, yes, the committee just died of its own accord.

Swent: As long ago as when I interviewed Twyla Thompson, I remember her saying, "I wonder if the technical review committee is still meeting." She was curious about what they were doing.

Krauss: She was the consummate politician, and she understood fully well that in order to approve a project they had to create some sort of a perception that there was this opportunity for the public to continue to be involved in the review of the adequacy of the mine's performance. And we understood that. We were certainly willing to make whatever effort was necessary to participate in that process.

And I suppose that under other circumstances, had the monitoring shown that there were problems, it may very well have been a useful process. There's nothing wrong with the theory. It's just peculiar in that it had isolated Yolo from participation with all of the rest of the governmental agencies in the regulation of the project. And the only reason that Yolo behaved differently was these few people whom I think to this day really have absolutely no confidence in the ability of government to protect their interests.

I have told Barbara [Krauss's wife] many times that I'm glad that we don't have to live with that kind of fear and uncertainty. These people really were legitimately convinced that their lives would be adversely affected by the activities of the mine. But they also are convinced that their lives are adversely affected by global warming and pesticides. Most of them--I still see them. I just saw John Ceteras and his wife and Frances Looney at the Marin Farmers' Market board of directors there. And they're still very dedicated to their point of view. I share much of that philosophy.

But it sure got overdramatized, the proceedings. And I'm sure it was difficult for people like Bill Humphrey and even Jack, I think, and others to understand what was going on politically. Bill's little comment that you showed me, where he throws up his hands and says, "My God, this stuff just doesn't make any sense to me!" [laughs] Well, it only makes sense in terms of people's perceptions and people's emotions and people's fears. Those are all real, and they all have to be acknowledged, and they all have to be worked with if the project is going to go forward. The technical review panel is the tool that allowed those feelings and perceptions to be legitimized and dealt with.

Swent: We're getting started now after lunch. We had nice hot soup, and back to work.

Krauss: Well, we left off talking about permitting and the differences among the counties and the ultimate outcome of the various permits.

Fast-track Engineering Creates Tension

Swent: You had just mentioned Phil Barnes for the first time.

Krauss: Yes, he was very instrumental in many ways in designing and implementing the environmental monitoring program and participating in the environmental management during construction. I'm trying to remember the timing. I think that Jack and I had done a considerable amount of the initial environmental background for the permitting and the environmental data committee and other pieces in 1981 and early '82. Then Davy McKee was brought into the--it seems to me it was '83; it may have been late '81 or early '82. But Homestake, not having internally the engineering and construction management personnel and experience, sought outside help to provide those services, and after evaluating a number of prospective firms, what was then known as Davy McKee and since became Davy International and then subsequently was bought by Kvaerner--was selected as the firm to do the project engineering and the construction management. At that point, we began meeting regularly with them in their offices in San Ramon, to provide environmental design input to their project engineering. We were embarked on what we had all agreed was a fast-track effort to--

Swent: I would like more explanation of how that works: fast track.

Krauss: Fast track means that everybody steps on everybody else's toes. [laughs] The idea was to try to move things along contemporaneously rather than sequentially so that engineering activities and permitting activities and initial procurement activities were all kind of telescoped together. Consequently, the project could be designed and permitted and constructed and brought on line in a shorter period of time.

I'm sure the professional engineering community has a more precise definition of exactly what they mean by that, but--

Swent: You have to assume that things are going to happen.

Krauss: Well, a lot of things are happening simultaneously, and it does make good sense and there's no reason just to sit around and wait until all of the permits are approved before you can do the engineering. A lot of the engineering has to be done in order to describe the facilities for which we were seeking permits. In fact, in many regards the permitting got ahead of the engineering. We were frequently asking the engineers to provide us with engineering detail for inclusion in the permits on portions of the project that they hadn't yet considered.

For example, on air quality permits, we had to specify in the permit applications the air control devices that would be applied. You would write down the brand name and capacity, and those choices and decisions had not yet been made, so in a lot of circumstances we had to push the engineers to go ahead and make a preliminary, almost arbitrary decision and included that as the description in the permit application. Not infrequently then, we would subsequently go back and amend that application to adjust it to the actual engineering.

But there was always a bit of I guess tension between the permitting team and the engineering team to try and come up with the information that we needed on a timely basis. I think we felt frustrated that we couldn't get from the engineers the design detail that we needed to put into our permits. I think the engineers felt frustrated that the environmental design team couldn't give them design criteria, concrete design criteria that they could input into particularly their hydrology, hydrological control structure designs.

I can remember John Ransone coming to me and saying, "Well, what is the design storm event for all these facilities, these ponds and diversion ditches?"

I said, "Well, there is no prescribed storm event in the code or to the extent there is one, it probably doesn't provide us with the protection we need to prevent the company from experiencing unacceptable risk."

For example, when we looked at the tailings pond, if we had employed the criteria that were suggested in regulation, which was to contain the volume of the 100-year, 24-hour storm event, we would have overtopped the tailings pond at least three times in the last twenty years, I believe. And yet we had entered into an agreement with the Solano Irrigation District that we would operate a zero-discharge facility and prevent any release to their water supply.

Obviously, in any engineering evaluation, there's a calculation of tradeoffs between likelihood of occurrence and cost. In the case of the tailings pond, we finally settled upon a 1,000-year, 72-hour storm event as the design criteria for the containment capacity of that facility.

Swent: You mean that there were three storms that were greater than the hundred-year record?

Krauss: Yes. Well, you know, it's one of those things that's very poorly managed in regulation. Most of regulation is written to prescribe the capacity of the peak flow that occurs during the single storm event, whereas most mine containment facilities have to be designed to contain the accumulated flow from a series of storm events. What we were really interested in was containing the worst-case accumulation of water that might occur during an exceptional winter, without overtopping, as opposed to containing the peak flow from a particular design event.

Really, in subsequent years, in my capacity in chairing the CMA, the California Mining Association environment committee, we did a study of all of the incidences of violation of water quality permits by modern mines in California, those that had been permitted subsequent to the most recent set of regulations. And 90 percent of the violations resulted from under-design of the containment capacity of tailings ponds and preg [pregnant] ponds and barren ponds and containment systems.

So I know Ransone and others were very uncomfortable that I wouldn't just throw out a number and say, "Hey, design it to a 24-hour, 10-year storm event and everything will be fine." The question was what level of risk is the company willing to assume on the overtopping of this facility, versus how much of the company's resources are they willing to commit to prevent that exceedance from occurring.

We did finally sort out the appropriate criteria for each of the facilities, the tailings pond being the most conservative, the other storm-water facilities being less conservative. They were designed for the 100-year, 24-hour accumulation, as opposed to the 1,000-year, 72-hour accumulation.

Swent: Had this been adequate?

Krauss: It has been adequate. We had one major overtopping early in the life of the mine of the M-1 sediment pond, but it's my recollection that there were construction problems in building that facility and it never was constructed at its full capacity, so perhaps it wouldn't have overtopped if it had been constructed as it was originally proposed.

All in all, though, considering the difficulty in the fast-track system of interfacing project design and engineering decisions with permitting activities, it went exceptionally well. If you really look at the outcome, the permitting in my view never delayed any of the activities of the project. To the extent that permits were not at hand, the engineering was not yet completed. I'm sure other people hold other views of that, but I think a close examination of the record would suggest that to the extent that we didn't have permits, it was largely a result of not having had the design documents that we needed to process those permits.

IV THE CONSTRUCTION PERIOD

Voluntary Commitment to Community Service Mitigations

Krauss: The construction period did begin in late 1983. We were able to acquire enough of the permits to initiate construction, even though we had not yet received all of our Yolo County approvals or our final waste discharge order from the water board, and I believe our Bay Area air quality permits were still under appeal.

Swent: There was one news account that I saw [leafs through papers] where there was a claim that you were doing construction work under a non-construction permit. This is in October 1985 in the Napa Valley *Register*. The headline says, "Sheriff Halts Homestake."

Krauss: Oh, yes, that's a later event. That was actually--

Swent: For use of explosives.

Krauss: Yes, that was actually mining, in the course of mining. I can tell that little story at this juncture. It's a nice little diversion. We actually began pre-mine stripping in '84 and ore mining in late '84 and early '85, and were stockpiling ore for initial processing and had processed enough ore to pour our first bar of gold in March of '85. And then in September of '85, I believe it was, we had our big community celebration, in which we tried very diligently to identify everyone who had had any hand in the project to that date and invite them to join us to celebrate the construction and startup of the mine.

Somehow in that process the Napa County sheriff had gotten left off the invitation list.

Swent: Oh, no!

Krauss: So two months later, in November, in the midst of mining one day, the Napa County Sheriff's Department and three different squad cars, sedans that you normally see on the street, came roaring into the mine pit with their lights flashing, and they drove all the way down--

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Krauss: They came roaring into the pit with their squad cars, and they blocked the equipment and asked for the person in charge. It was kind of funny because Mike Attaway, who was the mine manager at the time, was off-site at a conference, so Steve Drake, who was the mine superintendent, was the highest-ranking mine official. I don't know whether they actually cuffed him and put him in the car, but they required the mining to cease. I guess there was an agreement that Homestake and its attorneys would meet with the sheriff or the district attorney at eight o'clock the next morning to resolve whatever problem there was.

As it turned out, there was a five-dollar fee for an annual permit for handling blasting materials that had to be obtained on an annual basis from the county sheriff. The mine manager or the blasting crew normally had obtained that permit on a regular basis, and they had in fact gotten it the previous year, and they had failed to get it renewed. And so the sheriff decided to exercise his prerogative and shut us down.

But Denny and--I don't know if it was Mike or Jack--I think Denny and Jack went down and met with the sheriff the next day. My recollection of their story is that the sheriff said, "Boy, you must have had to scrape the bottom of the barrel to invite 1,200 people to that party and leave me off the list." [laughter] So that apparently was the genesis of his disappointment. It was clearly a clerical oversight. By the time we went through all of the lists of people that had participated--county assessors and treasurers and supervisors and planning commissioners and public health officers--and certainly it was intended [to invite him]; it was just a clerical oversight that he didn't specifically personally get an invitation, although there were also public invitations inviting anybody in the surrounding three counties to participate, so he wasn't excluded, but he felt slighted.

Anyway, that was a fun diversion for a few days.

Back to our construction activities. As we transitioned from our permitting into construction, and we were still completing some of the permitting, but we had enough permits to go forward with the construction of Morgan Valley Road and the grading and preparation of the mill site--

Swent: That's the road from Lower Lake.

Krauss: Lower Lake to the mine site, right, which existed as simply basically a one-lane dirt road at the time. It had to be upgraded to the capacity to serve the mine.

Swent: Did you ever seriously consider using the Berryessa Road as an access instead of Lower Lake?

Krauss: No, it was much longer and much less stable and didn't really access any population centers that would house our work force. In fact, we predicted that we would not increase the traffic on the Knoxville-Berryessa Road, and the county was skeptical enough to require us to install and operate a traffic counter for the first five years to prove to them that the traffic did not increase, and in fact it didn't.

But as construction began, we had a number of mitigations, community services mitigations, a number of commitments in our Lake County permits to mitigate any impacts on local housing, local schools, local utilities. Key among those mitigations was our commitment to hire people locally. We made I think an excellent achievement in our local hire program. We defined local residents as people who had lived in Lake County for at least six months before we began hiring, so folks couldn't simply move in today and register to vote and be considered a local hire.

We had long discussions with the school district in which they persuaded us that our property taxes would not pay all of their costs in accommodating additional students enrolled in the local schools. Under the California procedures for funding schools, the property taxes and state funds would cover the operating costs but not the capital costs of new classrooms and gymnasiums, buses and playgrounds.

So we sat down with the school district, and it was really a very pleasant negotiation. We said--

Swent: Where were you talking?

Krauss: This would have been Judy Lucksinger, who was then county superintendent of schools in Lake County, in her office in Lakeport, along with her attorney, John Drummond. They presented to us their calculation of what it cost per student to provide classroom space and gyms and school buses and cafeterias, and we discussed it and compared it and were satisfied that it was a reasonable presentation.

Jack was the lead on those negotiations, and he agreed that we would monitor the introduction of new students from our employees, non-local new hires into the local school district and pay them a fee per student that was enrolled as a result of our activities. I don't recall exactly what that number is. It may be in one of your other interviews. It seems to me that it was somewhere around $5,000 per student, and that ultimately we paid something in excess of $750,000 to the school systems for their capital improvements to accommodate new people that were brought into the district as a result of our hiring programs.

Swent: I don't have that amount here, but I have some notes on a conversation that I had with John Drummond, and I think that it was not included in his interview; this was a telephone conversation, I think, in which he said that the quality of students who came in as a result of this was so high. He said Homestake workers came in with money, they were upwardly mobile, they expected their children to do well and go on to college, so that this had a real effect on the makeup of the schools.

Krauss: This was an after-the-fact observation.

Swent: Yes. This was in a conversation I had with him just two years ago, actually, in '98, that he said this was the socioeconomic effect at the time.

Krauss: And Judy Lucksinger really predicted that in our original negotiations with her, in which she said, "We want to be reasonable and we want to achieve an accommodation with Homestake that's fair to both parties. We really welcome you in our community because you will"--the demographics of Lake County were such that I think 65 percent of the population were retirees, so it was very difficult for them to get a positive vote on a bond issue to support the schools. So they were very, very pleased to have educated people who would support quality education becoming members of their community, so it was a real positive relationship.

I don't think--at that time there was no clear requirement that Homestake compensate the schools for that increased enrollment. It was something that we did voluntarily. Certainly the schools could have protested the issuance of our permits, had we not agreed to enter into such an agreement, and if they could have persuaded the Board of Supervisors to not approve our permits then they could have forced us to make those payments. Certainly it never came to that.

Interestingly enough, I think this is another area where Homestake kind of predated--the laws finally caught up with the practice that Homestake pioneered. Four or five years after this agreement was reached, the state legislature passed a law that required new project builders, both residential and commercial project builders, to make payments to the local schools to cover the costs, their costs of capital improvements to accommodate the growth. The legislature set a formula of so many dollars per square feet of commercial space and so many dollars per--or perhaps they authorized the local school districts to set those rates.

So it became commonplace practice, but it was something that no one else had done prior to Homestake in the county without a lot of coercion. I think the school superintendent's previous experience had been with the geothermal industry and the Geysers, and they had had a lot of difficulty in coming to an agreement with PG&E and Union Oil on that same issue.

Swent: I think the local hiring had been an issue with that also, hadn't it?

Krauss: Yes, local hiring was an issue, and that again touches on the union-related issue. When we first went to talk to the members of the Board of Supervisors, one of the points they made very strongly was, "Don't treat us in the same way that the Geysers operators have treated us." And we said, "Well, what do you mean?" They said, "They've come in, and they've brought all of their workers from out of the county."

As it turns out, the reason they did that was that they had project union contracts that required them to hire by union membership seniority, and Lake County had no union membership, so the people in the union that had seniority, that were eligible to be hired on those projects, all came from Fresno or Bakersfield or Modesto or wherever. So consequently the county felt that it was a circumstance that didn't benefit their local constituents, and as a consequence they didn't have any political loyalty to the operators of the project.

In fact, I think it was Supervisor Walter Wilcox who said, "If you hire people locally, I've got no choice but to support your project because they'll vote me out of office if I don't." He was kind of a homespun, but very bright and sophisticated politician, and that was very, very true. To the extent that we hired local people who were voters in the community, then they were bound to support our projects. It wasn't rocket science.

Swent: That's interesting, because the plumbers union had got that big resort there, but their members--

Krauss: Well, it's the same plumbers union that still has that resort there today. It was interesting. I guess we can talk a little bit about the relationship to the union. But I was not directly involved, so I don't have a lot of first-hand knowledge about it.

There was Local 3, the Heavy Equipment Operators Union and the Operators Union. In my first-hand experience, both Davy McKee and Homestake provided to me and other managers what was called union avoidance training. We were trained to know what we could and could not do in terms of discussing union participation with the workers and how union organizing efforts were mounted and cards distributed and signatures gathered and votes required. We were encouraged to be aware of such efforts, and we were coached on those things that we could say that fell short of saying, We don't think you should join the union, but why in the world would you want to pay half your salary or a bunch of your salary in dues and fines and fees to someone else?

It was kind of ironic. The union did appear during the course of our permit hearings, I believe in both Napa and Lake counties but primarily in Lake County, where obviously most of the employment would occur. They made the argument that our Environmental Impact Report was deficient because it didn't include a chapter on wages and benefits, which certainly is not required by the law, but they thought it should have been there.

The local board of supervisors was very unsympathetic. They kind of looked at them and said, "We know why you're here. Sit down." [laughs] And that was the end of it. They did at one point rent a post office box and set up an office and begin kind of an organizing and canvassing campaign in the local community, which was kind of ironic because they placed an ad in the local newspaper, in the *Clear Lake Observer*, in which they characterized themselves as representing the local people against this outside corporate interest.

One of the reporters, Richard Mason of the *Clear Lake Observer*, took it upon himself to inquire as to who these people representing their local workers really were, and he found that the post office box had been rented by somebody with a San Francisco address and that everybody listed as being part of this association had an out-of-Lake County address. He wrote an editorial, I guess, revealing all these facts and kind of called them to task for misrepresenting who really had the local workers' interest at heart, which was, I'm sure, helpful in the overall effort.

There were periods when Local 3 bused from San Francisco pickets who picketed our park-and-ride facility in Lower Lake. It seems to me for some period of time they may have--it was just a matter of a day or two, not more than that--they picketed the main gate to the construction site, but it was almost a pro forma show of presence. It never really went anywhere, and it never really caused any great consternation among anybody. I think some people shook their fists at each other and called each other names for a few days, and then they went home.

I gather that it turned out, also from Richard Mason, upon his inquiry, that the people doing the picketing were not union members but were rather just people they had picked up out of the employment development office in San Francisco and bused them up there to carry a picket sign, so it was a peculiar effort all in all. It was a very inept effort if they had meant it intentionally.

Now, I know there were other activities. I understand there were other activities, discussions between the union and Homestake that went on earlier. I have subsequently met people who were involved on behalf of the union in that activity, and they indicated to me there had been discussions with Homestake management about the possibility of entering into a union project contract in advance of the start of construction and that they had been rebuffed.

There was an issue on whether or not the construction of the road, the improvement of the Morgan Valley Road, was a public project subject to the state requirements to pay prevailing wage for public projects. I believe that was litigated, and the unions actually lost, and it was agreed that since Homestake was building the road with its money and then donating the road to the county that it was not, at the time of its construction, a public project subject to prevailing wage.

Swent: This was at the time that there was this big mining boom being sparked all over the state. I thought that the unions felt quite strongly about this project, that this was sort of their test case to start unionizing all the other mines.

Krauss: It may have been. I'm not privy to what their strategy was. They did indeed dispatch a person to be in charge of their efforts at Lake County, a man by the name of Mark Stechbart, I believe was the name. He was the one that appeared at the public hearings, and he was the one that was responsible for the organizing activities that I described, and I subsequently heard through folks that are associated with the union that union management was very unhappy with his performance.

Swent: He was a journalist, I think.

Krauss: I don't know what his background was, but apparently they considered his efforts to be a failure, and he was terminated, and they kind of considered that whole episode as a black mark on their organizing efforts. But, you know, to me, not being doctrinaire on either side of the issue, it seemed fairly clear to me that hiring people in Lake County locally was a much more important goal than cooperating with the union.

And I think the company did in fact make extraordinary efforts in that regard. We entered into an agreement with the Yuba·Junior College to develop an industrial arts training center, and I think we actually compelled our contractors to participate in the funding of that facility and the equipping of that facility, and we worked with the Employment Development Department in Lake County to recruit people to be trained in that facility. They gave particular preference to people on the welfare rolls, and anybody who completed the curriculum in the facility was guaranteed employment at the site.

Swent: We haven't mentioned in this interview, but it has come out in others, that at that time Lake County had the highest unemployment rate in the state.

Krauss: Certainly one of the highest.

Swent: It was the lowest per capita income. It was about the most depressed county in the state.

Krauss: Well, that's a little skewed because you had a tremendous retired population living exclusively on Social Security, so that skews it.

Swent: But it was not an affluent county.

Krauss: By no means. And I think the average wage in Lake County at the time we began hiring was five dollars an hour or less. The construction employees were paid at least three times that; in many cases, four times that. And even today, the average wage in Lake County is seven or eight dollars an hour, and the mining employees, the hourly employees are probably averaging over twenty dollars an hour at this point, and more, of course, for overtime.

Really the only employment in Lake County for young people was either in tourism, supporting tourism, or seasonal employment in agriculture, in the pear and walnut businesses, neither of which paid much. As a consequence, all the wages were low. I can remember one woman who drove a truck for us during the early years of operation. I talked to her over lunch one day, and she had been a bank teller in Clear Lake, and she had been earning seven dollars an hour as a bank teller, and now all of a sudden she was earning eighteen dollars an hour as a truck driver. She said besides, she much enjoyed driving a truck [laughs] over hassling the public over weekly deposits.

It was certainly a real economic boon to the community. In addition to local hiring, we made a commitment to procure everything that we could through local venders. Our Caterpillar fleet was bought from the Napa Caterpillar dealer, who subsequently retired shortly thereafter! Our fuel was bought from the local jobber in Lower Lake, Jim Jonas.

And up and down the community you could see the services growing to support the economic input from the mine.

Swent: That was another thing John Drummond mentioned, that in '98 they were really feeling the full effect of the fact that one worker means five service jobs.

Krauss: Certainly. I don't know what the appropriate ratio is, but--

Swent: And that's a long-term effect.

Krauss: Yes. I would dearly love to get somebody to get funding for some graduate student to do a follow-up. We have all of the original data from our pre-project socioeconomic surveys. We were required under our permit to do follow-up surveys of how many people we hired locally and how many people--all of those data still exists. And then I did get a little bit of money to hire the firm that did the original pre-project surveys to come back and look at the period during construction and startup and its influence on taxes and unemployment and welfare and school enrollment, so there is some data. But it would be nice to get someone to follow that through the life of the mine.

Certainly one of the allegations is that mining is boom and bust, and that the end of the life of the mine is equally detrimental to a community as the beginning of the mine has been beneficial. But I don't think that has been the case in Lake County. I think it's very clear that the wealth that came into the community stayed and was multiplied and has grown, and that has attracted other industry and other economic activities. So there has not been a bust.

I think there was a rapid period of growth and then a leveling out of that period of growth, and maybe some short-term declines in housing values and vacancy rates, but I don't think there was ever any big boom in unemployment or welfare or those other costs to the community as our employment has declined. And I would like to document that. I think it would be a useful study.

Swent: It would be very good.

Davy McKee, I think, is a non-union employer.

Krauss: They went out to bid with construction firms to undertake the actual building of the facility. Boy, you'd have to talk to someone other than me about that. My understanding was that the bids were blind to union or non-union status, that that was their instruction. But I also understand that the winning contractors had both union and non-union arms of their companies, and it was the non-union arms that submitted the winning bids. And I think McLaughlin Constructors, for example, was a joint venture between two major contracting firms that was specifically established for the purposes of constructing the McLaughlin Mine. I don't even remember now--you would have to go back into the engineers' notes to see who those firms were.

But I think that it was clearly perceived as being cheaper to go non-union, and if not a written goal and objective of the project management, a spoken goal and commitment of the management of the project. I think ultimately--I don't think the welfare of the workers suffered a bit by not having a union.

Certainly during operations, it's really clear that the people are very pleased with their employment. They like the relationship they have between management and hourly employees. They like the freedom they have to move from one job to another. They feel that they've had reasonable pay and excellent benefits. I've had direct conversations in which I've queried people about these particular issues, and pushed them hard to say, "Don't you think you'd rather have been a member of a union?" And never found one that supported it, of the operational people.

During construction, I know there were a lot of individual jobbers--welders, for example, who owned their own tools and owned their own rigs who got hired and worked, and when they were done, drove off to Texas to do welding on some of these oil pipelines. I don't think that kind of person would have achieved employment had it been strictly union labor, but I don't know. Again, that's outside of my area.

Swent: I've heard, too--and I can't remember where I heard it--that a lot of the workers had been union members and were non-union at the time and were not interested in agitating for the union.

Krauss: I think that most of them were interested in being employed, and if you had to be in a union to be employed, you were in the union, and if you didn't, you didn't. They certainly knew the ropes on how to dance between one status and the other without getting caught, so--

There were other parts of the community that were also affected. We worked very closely with the Lower Lake Water District. That again was something I didn't negotiate directly, but I think it was kind of a last-minute realization that we needed a considerable water supply to provide dust suppression and compaction water during construction.

Swent: That was underestimated at first, wasn't it?

Krauss: Well, it seems to me that in the original feasibility [study] there was no provision for it. In fact, it was kind of an afterthought by Davy McKee that oh, my gosh, we are going to need this water supply. If you weren't fast-tracking a project, that oversight probably wouldn't have occurred, and you might even go in and build your freshwater reservoir and let it fill up and then come back and build the rest of the project, but meanwhile your investment is languishing, and that wasn't a desirable way to proceed.

But when it was recognized that we needed water and the only available supply was through the local water district, because they had the rights to pump water from Cache Creek, which came from Clear Lake, there were agreements negotiated with the water district to provide them with facilities. We built a new diversion facility to take water from Cache Creek, and we drilled a number of wells and put in a new pumping facility, and then constructed a fifteen- to eighteen-mile water line from Lower Lake to the mine site to provide water during the startup construction period.

Solano Irrigation District

Krauss: This continues the discussion that is, I believe, in the earlier interview that we conducted, the '96 interview that we conducted, about the Solano Irrigation District and their intervention in the permitting process--and really our failure to have, on a proactive basis, adequately contacted and included them in our pre-permitting program. It was an oversight that I made, and it caused us to play some catch-up.

The part that is not included in the other interview is that the primary water user of the Solano Irrigation District water, who prompted their involvement in the permitting, was Anheuser-Busch, who operates a major brewery in Fairfield that uses the water from Lake Berryessa. I've been told, though I certainly don't have any firsthand evidence, that one of the Capay Valley opponents actually got angry one day, and picked up the phone, and called Anheuser-Busch in Fairfield, and said, "Did you know that this company is going to put a big cyanide mine upstream of your water supply? And if you don't stop them, I am going to organize a boycott of Budweiser beer products in the Bay Area." Well, this caught their attention.

Swent: Oh!

Krauss: And obviously--I believe that they had had previous episodes where allegations about the quality of their water had caused loss of sales.

Swent: In other--?

Krauss: In other locations, not in California. They then directed Brice Bledsoe and the Solano Irrigation District to become actively involved in the review of our permits, and that led to the review of our engineering and environmental documents by Solano Irrigation District's independent consultant, the negotiation for environmental monitoring that exceeded that that might be otherwise required by the Water Board.

Swent: Which I guess you had to pay for, didn't you?

Krauss: Yes. But you know, in the long run, it really didn't--there was additional cost for one element of the program, which is what we've always called our "continuous monitoring facility," which is in reality a weir with an Isco sampler, that takes grab samples every ten minutes.

Swent: What kind?

Krauss: Isco, I-s-c-o. It is a brand name of a company that makes pumps and environmental sampling equipment. But it would take little grab samples, pump little grab samples from the [zoning well?] in this weir, and composite them into a big jug, and we would take it out once a week, and analyze it for cyanide. When we found no cyanide in it, Anheuser-Busch and Solano Irrigation District were happy that they could tell the public with certainty that there had been no release of cyanide into the water out of which they made beer.

There were quite lengthy negotiations with them as to what the nature of that monitoring system might ultimately be. Their consultants initially proposed some sort of electronic probes that would be installed in the weir, and whose output could be read on a screen on their desks in Fairfield and Vacaville.

Swent: Where is the weir? Over by the processing plant?

Krauss: The weir is below, downstream of all the mining facilities on Hunting Creek. It is just below the waste dump. It is the monitoring station that we refer to in all of our documents as Hunting Creek Number Ten. It is downstream of the tailings pond; it is downstream of the process plant; it is downstream of the waste dumps.

Swent: And that does eventually go into Lake Berryessa?

Krauss: It does, yes. Hunting Creek, about eighteen miles downstream from there, enters into Putah Creek, which another five or six miles downstream from the confluence of Hunting and Putah goes into Lake Barias--which is a 1.6 million acre-foot reservoir, so it would take a huge release before anything would ever be detected in that water in any case.

Swent: Cyanide degrades rather quickly, doesn't it?

Krauss: Yes. So--and I think their experts, certainly Anheuser-Busch's experts; I believe SID's--I don't know if SID's experts recognized that--but our experts all understood that the whole point of this monitoring was not that it would protect water quality, but that it would provide data that would assure that there was no public perception that there was any problem with the water. Again, it is an issue of perception. You had to be able to say, "Yes, we can prove with certainty that this event has not occurred."

The agreement with SID that we described in the other interview is in parallel an agreement with Anheuser-Busch. So there was a contract between Homestake and Anheuser-Busch that provided that we would conduct the monitoring that we agreed to, that we would provide them with advanced notice of any proposals to change the project, or seek new permits, that we would give them prior notice of any release from a project, or threatened release from a project, so that their people would have the ability to respond to any press inquiries that might affect them. We agreed to jointly hire an independent water quality expert to adjudicate any disputes between the parties, and that ultimately became an independent expert who took, on an annual basis, additional water samples which we integrated into our quality assurance program. It was an inter-laboratory check, so it worked quite well for us.

He wrote an annual report. He visited the site once each April, and wrote a report that went to Anheuser-Busch and SID saying that he had visited the site, and reviewed the environmental data, and taken his own samples, and everything was as advertised. And that did turn out to be useful on at least one subsequent occasion, when we had a renewal of our discharge permit, our water discharge permit, our NPDS permit, which regulates the release of storm water.

Rain water running off the facilities has to meet the what are called effluent standards and receiving water standards. It is a permit that is required under the Federal Clean Water Act, as a delegated program issued by the regional water quality boards in California. It has to be renewed on a five-year basis.

On one of our renewals, I think it was probably in 1995--I'm not sure which--we had a group of pipe fitters that decided to oppose our permit. It is a group that formed, called initially "Tame TIC." TIC was one of the contractors who helped build the McLaughlin facility.

Swent: The Industrial Company, I think it was?

Krauss: They went by the name of TIC. And so the pipe fitters took some of their members' dues, and hired a couple of attorneys to run around the state and intervene in permits that were for projects on which they did not have a union contract, a contract for union labor.

So Tame TIC decided to intervene in our NPDS permit, and actually trespassed upon the site, and took samples from our sediment ponds, and had them independently analyzed--then "inadvertently" released them to the press as having concentrations 1,000-fold greater than they should have, which turned out to be a little mistake by their analytical lab. Their analytical lab, I think at their direction, reported results as milligrams per cubic meter that would otherwise have been milligrams per liter, which increased it by 1,000-fold, and--so it was one of those tactics that they've used elsewhere in the state.

But the fact that we had this agreement with the Solano Irrigation District, and that we had a proactive relationship with the politicians who represented the region, allowed us to proceed with that renewal without any real hitch. The Solano Irrigation District was of course concerned that this union group was seeking press coverage of the fact that the mine was causing all this pollution and shouldn't get a renewed permit. So they immediately ran out their independent expert, and we had a tour of the site, of the board of directors of the Solano Irrigation District, and they shared with the press the agreement, and the independent expert's annual reports, and very quickly satisfied the public that there was no problem whatsoever. Of course, that made it quite easy for us to get the renewed permit, because somebody else had defended our record on our behalf.

It was also interesting at that point that the state senator and state assemblywoman, who represented our district, also really intervened on our behalf without any prompting from us. The labor representatives had gone to Mike Thompson, who was then our state senator, and asked him to join them in condemning Homestake for their water quality violations. And we had worked very closely with Mike over the years. He had served as an assemblyman before he went to the state senate. He is now our Congressman. We've always kept him informed, and provided him with tours of the site, and he had actually had a proclamation commending Homestake passed by the state Senate at the time we entered into the first UC Reserve agreement, and attended all of our annual picnics, or our million ounce celebrations, anyway.

So when the unions contacted him, he told them, "Well, you're going after the wrong people, you know. If you want to attack somebody's environmental record, go after the bad guys. These are the good guys." And then he went one step further. He directed his staff to contact the newly-elected assemblywoman who succeeded him in the assembly, Valerie Brown, and alert her as to what was going on, and to share with her his opinion of Homestake and its environmental record, and urge her not to get trapped into opposing the project, because he thought it would be detrimental to her political career.

Swent: Is this the pipe fitters' union still?

Krauss: Well, I think it has always been the pipe fitters; that is my understanding of it. And now they have changed their name from Tame TIC to something else. I believe there was litigation between TIC and the group where the pipe fitters were found guilty of restraint of trade. Then there was some settlement wherein they agreed not to become involved in any projects of which TIC was a contractor for a period of five years. They may have paid some damages too; I'm not sure. But it was--it is an interesting tactic, to try and force a union contract on a project proponent by intervening in their permits. Of course, they said, "Gee, if we enter into a union contract, we'll relieve our intervention, and we'll remove our objections from the issuance of your permits."

Swent: Did they actually come right out and say this?

Krauss: The did in the case of Hayden Hill. Hayden Hill, which was an Amax project at the time, it was my understanding, actually agreed to hiring a certain percentage of union workers on their project in order to get them to drop their intervention in their air quality permits.

Swent: Did they ever talk to you, directly?

Krauss: As soon as they opposed our permits, I called them, and invited them to visit the site, and toured them on the site, and showed them what we were doing, and we had a very interesting conversation. We took our usual approach to anybody that had an objection, was to show them that there was nothing wrong. And I think at the end of the day he said, "Well--" He--

Swent: Who was it, do you remember?

Krauss: I don't remember the name now. I would have that also in my notes. I am trying to remember the conversation, but he in effect conceded that he knew there was no real problem there, and that they were there because it was a non-union operation, and that they were going to get us in the press. I said, "Well, I think you are going to be surprised." That was the end of--I couldn't resist. That was the end of our conversation. And they were surprised. And they did withdraw their opposition and go after other people.

Swent: How did they register their opposition?

Krauss: They actually intervened in the renewal of our NPDS permit before the regional water board in Sacramento.

Swent: They had to file a formal protest?

Krauss: Yes. They appeared in opposition to the permit. But then they also issued a press release to the local newspaper saying that Homestake was polluting Lake Berryessa and was a threat to everybody's health and safety, and it was a pretty inflammatory press release. So far as I know, none of the newspapers ran it; all of them checked the facts, and instead of running the union's press release, they ran this story from the Solano Irrigation District saying that the Solano Irrigation District has been taking all of these extraordinary measures to protect the quality of the water and the interests of the people downstream of Homestake's mine. The SID agreement did pay dividends on that occasion.

The other wrinkle is that in the original agreement, contract, between Homestake and Anheuser-Busch, there was a provision that if a perceived release from the mine caused a loss of sales to Anheuser-Busch of beer from their Fairfield brewery, then Homestake would indemnify them to the extent of that loss, and it didn't have to be an actual release, it could simply be a perceived release. That was a matter of quite a bit of contention between Dennis and Bill Langston, and I think Langston finally decided that there was no alternative but to swallowing that bitter pill, that he was unable to negotiate any more favorable agreement between Homestake and Anheuser-Busch. Dennis always argued that it was just an unreasonable risk to the company that could destroy the whole company, if somebody had called up the newspaper and said, "There's cyanide in your beer," and their sales went down--we would be in effect responsible.

About three years later we went back to Anheuser-Busch, and we had a number of other changes that we wanted to make in the agreement. It also stipulated when and how we could ship cyanide to the site, and some other things. We wanted to liberalize some of those provisions, and Dennis and I decided that we would take a run at the indemnity and see if we couldn't persuade them that was unreasonable, that the indemnity should protect them against an actual release that adversely affected the quality of the water that they used. We were able to negotiate that revision to the agreement, which substantially reduced the company's liability to that occurrence.

Swent: What had been Bill Langston's stand?.

Krauss: At the time that he agreed to enter into that, it was that he had tried to negotiate around it, and there was just no way, and if we didn't agree to it, we were going to get delayed, and we had to live with it. I think that what enabled us to persuade AB, Anheuser-Busch, to relieve us of that obligation, or to make us responsible for an actual release rather than a perceived release, was their satisfaction with the way that we had cooperated with them, and implemented the agreement, and kept them informed. They were very aware of all of our environmental compliance activities.

Swent: You had a good track record.

Krauss: We had a good track record, and they were comfortable that the perception was not the issue that it might have been; that if somebody picked up the phone and said, "Hey, there's cyanide in the beer," there was enough public understanding that that wasn't the case, that it was no longer the threat that it might have been. So that was a whole interesting sidebar to the rest of the permitting issues.

Swent: That agreement is still in place?

Krauss: The agreement is still in place. We just talked to Anheuser-Busch, because as we involve the University in the use of the site in its post-closure role as stewards of the McLaughlin Reserve, we had to disclose to the University any underlying agreements that the property was subject to. and so we asked Anheuser-Busch if they felt comfortable with us sharing the fact that this agreement existed. We didn't discuss any of the history or how it got to be, but--and they said, "No, we're quite comfortable with that becoming public knowledge, at least to the University at this time. It has worked out well for Homestake, and it has worked out well for Anheuser-Busch, and we can both be proud of it." So we did provide them with a copy. but I don't think it has been talked about publicly beyond that discussion, and it probably shouldn't be until Anheuser-Busch explicitly says, Yes, that is water over the dam.

Swent: Their sales are still good.

Krauss: Yes. We are no longer concerned with that matter of public perceptions. That would conclude that little discussion as a sidebar.

Swent: Valerie Brown was the state assemblywoman?

Krauss: State assemblywoman who succeeded Mike Thompson in that district when he moved up to the state senate. And she became a good friend, not just of Homestake and the McLaughlin Mine, but also of the California Mining Association. She helped with some legislation on a number of occasions in Sacramento based on our relationship over the McLaughlin Mine.

The same pattern, as soon as she was elected, we invited her to come visit, and showed her what we were doing, and described to her our programs, and--I think that, I've always described that as the care and feeding of a network, that kind of supports itself. She would then talk to Mike Thompson; she would talk to other people whom she knew, and get confirmation of what we had told her. So it wasn't just Homestake's word, it was word from the University, word from Napa County, word from Yolo County, word from Betsy Marchand, word from whoever. Anyone she talked to reinforced that same point of view, and pretty soon that becomes--they are perceptions; everybody shares the same perception--I would like to think that it was based on reality, as opposed to paranoia, and I believe it was, or is.

Swent: Did you have another hassle to get the permit to build that water line?

Krauss: I don't think the permitting was that difficult. Very basically, it was just a late start to do the engineering and construction of the facilities and get the water where we needed it when we needed it. We did end up then leaving some substantial improvements with the local water district, so when we no longer needed their water they did have a couple of additional wells and this out-take facility that improved the reliability of their water service to the local community.

Swent: There were a couple of people on Morgan Valley Road who objected, though, weren't there?

Krauss: I think the only objections that I heard were from people who thought that we should have provided them with water as well. And were unhappy that the facility was a temporary facility that was going to be removed once we had water in our freshwater reservoir. But, yes, everybody would have loved for us to--it's a very, very water-short area, and in fact many of the local houses out along there have to truck water to their homes all summer. You see them lined up in Lower Lake. There's a fire hydrant where they're allowed to buy water and fill their tanks. They have these makeshift tanks on the back of their pickup trucks and fill them up and drive them out and provide water for their little homes.

Swent: Their wells don't work?

Krauss: It's a very, very low permeability foundation material, geologic material. But we did provide other utilities to the folks living along the road. When we brought in power, we had to, through PG&E, Pacific Gas & Electric company, acquire right-of-way for the location of the power line, and even though we were putting in a 115-kv, kilovolt, line to serve our needs, we spent the additional close to half a million dollars, I believe, to install on the same poles the 12-kilovolt line that would provide take-off for local residents along the route.

We did that both as a service to the local community and also in realizing that certainly it would make it easier to negotiate the right-of-ways we needed to get the line out there.

And similarly, ultimately, when we brought the telephone line all the way out to the mine--prior to that, we had worked off of a microwave repeater, and we did finally bring a land line in, and that was also engineered and designed in a way that would provide local service to the folks along Morgan Valley Road.

Constructing the Morgan Valley Road

Krauss: Constructing the road was an interesting challenge. The road was built at the same time that the plant was being built, so we had to move our construction troops back and forth over a road under construction for a period of some eighteen months. So as a consequence we established a park-and-ride facility in Lower Lake, and Davy McKee acquired a set of buses. I think they came from the New Orleans World's Fair or something, a fleet of thirty-five school buses that were used to bus to and from the site the construction employees during the construction period.

It was an interesting project. It involved two counties. The two counties were quite different in their approach to it. Napa County--they simply gave us a set of design criteria, engineering criteria for the design of the road and said, "Go hire an engineer and design the roads and we'll review the plans, and you can construct them and--once they're approved you can construct the road to those criteria, and we'll provide period quality inspection to make sure that you're constructing what you committed to."

Lake County was a little different. Again, I wasn't directly involved in it, but apparently the public works director said that, "I have some engineers in mind who I think can design this facility, but of course you're welcome to hire whoever you want, but if you hire somebody that's not on my list, I'm going to have to charge you for me to hire them to review your design, to make sure it meets my standards." So it was kind of a backhanded way of saying, "Hire one of my cronies to design this road."

Davy McKee did the road design in Napa County, and despite the fact that the land is all serpentine and inherently less stable, it has been a much more reliable facility. They designed all the cut slopes to one-and-a-half to one instead of one-to-one, and we've had very little failure and very little maintenance requirement.

Lake County--the road cuts were designed standardly, at one to one, and I don't think there's a square yard of geology in Lake County that will stand at one-to-one, so everything failed, everything eroded, everything--we had to essentially revegetate the road cuts repeatedly in order to get any stabilization of them, simply because they were over-steep.

Swent: There's one place there, I remember, sort of near the mine that I think is still caving in now and then, isn't it?

Krauss: Yes, there are some areas that--and, in fairness, it's a very active and young geology, so it's subject to a lot of failure. And there were some landslides along the road that would have occurred regardless of the design, just native landslides in the local geology that were going to move and would require repair. There was kind of a different philosophy in Napa County. It's kind of an issue of sophistication. Napa County's view was to spend a little more money up front and avoid future maintenance costs and do a little better job of protecting the environment. Lake County's view was, well, you cut it all at one-to-one and then you come back and clean up what fails, and it will all work out in the long run.

We also had--and it was another one of those issues I never quite understood all the details on, but in our original permits we were able to produce road rock, base material, from the waste rock at the mine. We put together an aggregate plant, a crushing and screening plant, to crush and screen overburden from the mine and develop substantial stockpiles of it for use in road construction.

That material was all used for--was used initially--we began building in Napa County, working back towards Lower Lake when it came to placing base and ultimately paving the road then. We used our own material on the roads all the way through Napa County. When we got to Lake County, apparently there was some argument between Davy McKee and Lake County as to whether or not the rock we were producing met the appropriate specifications for hardness.

I think, as it came down, it was a matter of how often they were going to require us to do tests and how that might affect our schedule of placing that material, and apparently there was some unevenness in the quality of the rock, and occasionally it didn't meet spec. But interestingly enough, the public works director had an alternative in mind that would save Davy McKee the trouble of having to do all this testing. He said he just happened to know about a pile of rock that was already crushed and prepared, sitting in a local site in Lake County that was suitable for the job.

He had another pile of rock in mind that apparently one of the local aggregate producers had mined and screened and prepared for a Caltrans [California Department of Transportation] contract, and I heard alternate stories. One was that he didn't ultimately get the bid, and the other was that Caltrans decided the material didn't meet their specification and rejected it. But whatever, he was left with a pile of 300,000 cubic yards of road base that the public works director said he was confident would meet spec and that if we were to use that material instead of the material we were producing out of our own overburden, he would not require it to be periodically tested.

This proved to be very attractive to Davy McKee, so ultimately that material was used. And I would have to say after twenty years of watching that road, I suspect that it didn't meet spec because there's a lot of compaction and a lot of waffling.

[tape interruption]

I was going to talk a little bit about the busing, which I think I already did, and then just the amount of traffic on that road, with all the equipment and supplies and material and everything else coming in, and the number of near accidents that occurred. And then a little bit about procurement and scheduling. That was really pretty extraordinary to get all the parts and pieces, and to get them there and get them out there at the right time. And a little bit about the scheduling. I could say a word or two about the permitting schedules and the expectation that everything would occur on an optimistic schedule rather than a realistic or pessimistic [schedule].

I really need to bring in Paul Morgan and the work that he did. He was a Davy McKee employee who handled the actual building permits, the construction permits. I'll work down from the busing to him. He had a pre-submittal meeting with all of the plan reviewers to get them up to speed, which worked very well.

Swent: Yes. You thought that the rock was not up to spec.

Krauss: Well, it seems like it was a convenient solution to a nonexistent problem. It was kind of interesting, though, the construction of the road while the construction of the plant was ongoing, and it resulted in quite a little bit of traffic conflict. Even though we did have the thirty-two buses to bus the construction employees in and out, we also had all of the dirt-moving equipment to bring in and then all of the steel for the buildings and all of the cement for mixing concrete. There were tremendous amounts of materials and supplies, fuel for the earth-moving equipment, and so there was a real logistic challenge, I think, to get everything in and out of there and maintain construction on the road at the same time. It was something on which Davy McKee did a really outstanding job.

They had kind of a traffic office at the park-and-ride lot that we had established in Lower Lake, and all shipments arrived there, and then they would dispatch them from Lower Lake to the mine on whatever schedule worked, so that it didn't interrupt the construction, and consequently we were able to maintain everything at the same time.

There were close calls. In the traffic control office they had a series of Polaroid pictures of trucks that one side had gone into the ditch or it hadn't quite rolled over or a fuel truck with three wheels on the road and the fourth one suspended in midair. And there were some spills and accidents, but none of them created any environmental difficulties. I think a load of autoclave bricks got dumped one day and things like that.

It was just the logistics of scheduling and moving people and equipment and materials and supplies in and out of that site on a consistent basis was a whole task in and of itself.

Swent: How many people were--at the height, how many were employed?

Krauss: At peak construction, my recollection is that we had 1,200 hourly employees plus another couple of hundred--Davy McKee and Homestake and other consulting engineers and surveyors and subcontractors.

Swent: Something over 1,400.

Krauss: Total, was the very largest number at any one time. Obviously, that ramped up and ramped down as different activities occurred.

Swent: Where were they living?

Krauss: Well, they lived in Lake County. Lake County has quite a stock of vacation homes, so the county was able to absorb a lot of the incoming employment. And, again, we did hire quite a lot of them --my recollection is we were able, out of that 1,400 or out of the 1,200, not out of the 1,400--we were able to get 60 percent of them out of the local labor force. But there again, the resorts had RV parks and trailer parks. Lake County was particularly easy and flexible in its housing supply to accommodate that.

But it certainly changed the character of some of the local communities. I know there were a number of little businesses that popped up that served the construction crews in terms of coffee in the morning and box lunches, and the Five Brothers bar at night. They had a huge check-cashing enterprise in the back room, to cash people's paychecks. So the local economy very quickly adapted to and took advantage of all the opportunities that were presented.

Mine Construction: Struggles for Compliance by Engineers

Krauss: The actual construction required obtaining another round of permits. The first round of permits that we obtained were the planning permits, the discretionary permits, the environmental permits, basically the entitlements to build the project, the licenses and entitlements. And then once you have those licenses and entitlements, then you have to provide the local agencies with your detailed construction drawings and obtain building permits for foundations and grading and electrical and structural.

Of course, a project of this scale was out of the normal capacity--it was beyond the normal capacity just in terms of volume of drawings to look at and approve. So we were very concerned that that would become a bottleneck in the permitting process. Again, each of the counties responded to it a little differently. Lake County had had the experience of providing permits for PG&E power plants and the Geysers. Apparently they had relied entirely upon PG&E's engineers, without doing a separate, independent review of their construction calculations and engineering drawings, and simply stamped them "approved," and PG&E went off and built their plants.

But they did accept the fees that accompanied the normal review of those plans, and that had become an issue that came before the Lake County grand jury, so they were very anxious not to repeat that difficulty. So we arranged with them that we would provide them the funds to contract with outside engineers who would supplement their normal staff in the review of those drawings.

I think to some extent in Napa we may have helped them supplement their staff, too, but they had a bigger plan review staff. Davy McKee had an environmental manager by the name of Paul Morgan, who was quite instrumental in orchestrating all of the construction permitting and also working on site with me to help assure that we complied with all of the requirements of the permits that we had.

Paul had the foresight to organize kind of a pre-permit application, building permit application, meeting in San Ramon, and we invited the chief building officials and some of their staff from each of the three counties, and they sat down with our engineers, and we gave them a schedule: this is the schedule on which we want to construct these things, and these are the number of drawings that will be involved in the grinding building and the grinding mills and the whatever, and the electrical facilities and in Lake County the offices and the process facilities. So they had the ability to predict and schedule for the review of all of those permit applications, and consequently it went pretty smoothly.

Swent: I was thinking that this would be entirely Davy McKee who had to get the permits to build it.

Krauss: Well, it was primarily their role as opposed to Homestake's role and my responsibility, but they all had to dovetail with the planning permits, and the counties cannot issue the building permits without getting them countersigned by the health officials and the planning officials. So Paul and I were constantly meeting with the planning officials to show them how this particular building permit was in fact a piece of the project as approved in their conditional use permit, and providing them evidence that those things that we were required to do to prevent erosion and sediment release and protect rare plants and all of the conditions of approval were being met in order that they could then sign off the building permits, because signing the building permits was their leverage, to make sure that we complied with all of the other requirements.

And keeping a construction force with two major contractors and dozen of subcontractors and huge numbers, pieces of earth-moving equipment--all in compliance with all of the conditions of the permit all of the time was a real challenge. Initially Paul and I had that challenge, and then Phil Barnes from Homestake's Pitch [Colorado] operation transferred to McLaughlin and became my senior environmental engineer and later chief environmental engineer and was really quite instrumental in working with both of us in ensuring permit compliance.

It was a constant battle. I really have to feel that Davy McKee didn't really place the priority on complying with the conditions of the permits that they should have. That's not Paul's fault, because he certainly did his best, and he and I were equally frustrated. But it was so easy for somebody to drop a blade when they ran their D-10 from Point A to Point B, and blade up a patch of rare plants or run through an archaeological site. Even though they had no reason to have that piece of equipment in that location; it just happened to be the shortest route to get there.

So very quickly we discovered that the only way to manage that was actually fence or at least put in fence posts and big signs that said "Keep Out," but a fence to keep people's equipment out of those areas where we knew we had rare plant populations and archaeological sites.

And in order to fast-track the archaeological studies, we had hired Dave Frederickson's group at Sonoma State University to provide the archaeological services in the context of the environmental impact report. They were able to identify and locate and classify most of the sites. But you never have 100 percent of them. And we did arrange our facilities to avoid practically all of them. There were a couple that we couldn't avoid that they had excavated and researched and documented, but there was still uncertainty that undocumented sites might be discovered during earth moving. That's always a possibility.

And in order to not have to stop construction and wait until they could come from Rohnert Park to the site and investigate and determine what was the appropriate mitigation, we actually employed one of their staff archaeologists for, I believe, eighteen months of the construction period, at least twelve months of the construction period, when most of the earth moving was going on, so that any time new evidence of archaeological resources were turned up, he could evaluate them and--

Swent: What sorts of archaeological treasures were there?

Krauss: Well, there was nothing really terrific out there from the layman's point of view, but it turned out that it was a territorial interface among three or four different tribes. I would be hard put to name them. Probably the Miwok and Wappo and Pomo or something. But there was obsidian that could be identified as to its source of origin that came from Lake County and Borax Lake and others that came from Napa County, on the Silverado Trail, a known quarry and others that came from Sonoma County.

And it appeared to the archaeologists that it had been a point of interaction among the tribes where quite a little bit of trading and exchange had occurred. There were coastal shells and other things that had obviously been carried up there and traded. So because it was a boundary among tribes and there was evidence of presence of different tribal groups, they found it particularly useful in trying to understand economic relationships among the prehistoric population.

But the bulk of the sites were temporary use sites, hunting sites, where people would sit and camp periodically while they were gathering acorns or hunting game or gathering berries. The major village sites were on the shores of Clear Lake, where Anderson Marsh State Park is. There were also some very substantial village sites in the location, in what's now Lake Berryessa, along Putah Creek in the Monticello Valley.

Unfortunately, when Lake Berryessa was constructed, there was not the same awareness or sensitivity for historic and archaeological resources, so those sites were inundated without any real documentation. That was a real loss to archaeological scholars.

There was one burial on the site, in Yolo County, above the shores of Davis Creek Reservoir, apparently a relatively late burial because it included trade goods, iron ware and glass beads and other things, as well as flint or obsidian materials. And that was investigated by Tom Origer and a group of students from the Santa Rosa Junior College. They actually held a field class out there for a summer; it must have been the summer of 1984. They camped out there for three months and excavated around the site and documented it and wrote some very nice papers on it, and apparently had a good time. Probably drank a bit of beer and skinny dipped in the reservoir. It may have been as late as '86. I'm not sure.

But yes, those were obviously things that the construction managers found vexing, but issues that were required by law to be addressed, and properly addressed. In my views, things that had we not addressed properly could have undermined our credibility in the community and made our future relationships with the regulators much more difficult.

But it was almost a cops-and-robbers relationship. I was never comfortable that if I weren't there, looking over their shoulders, that they would of their own volition comply with what they knew to be the requirements of those permits; that if they could get away with it, they would get away with it. Consequently, I had some real battles with them over the construction period, and there were some dumb things--particularly towards the end, when the actual costs exceeded their anticipated costs, when there were budget overruns and people were looking for ways to save money at any turn of the road.

There were attempts to eliminate some of the revegetation programs. There were attempts to minimize the sediment control that was required in our permits. We actually were able to persuade the water board and the Department of Fish and Game to let us undertake earth-moving activities throughout the winter of '83-'84.

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Krauss: At that time undertaking winter earth work and construction was prohibited by both the water board the Department of Fish and Game, but we were able to negotiate with them an exception to that prohibition by agreeing to implement very careful sediment erosion and sediment control measures, which included being very careful to divert accumulated rainwater around the construction areas and putting up--we used straw bales basically as straw-bale dams to collect and filter the dirt out of rainwater running off of our construction sites. I think we must have cornered the market on straw bales in northern California. We had literally thousands of them, several dozens of truckloads of straw coming in and off-loading, and bales spread for miles along the roads where we were constructing.

Swent: You had two construction sites at that time, didn't you? The processing plant and the mine?

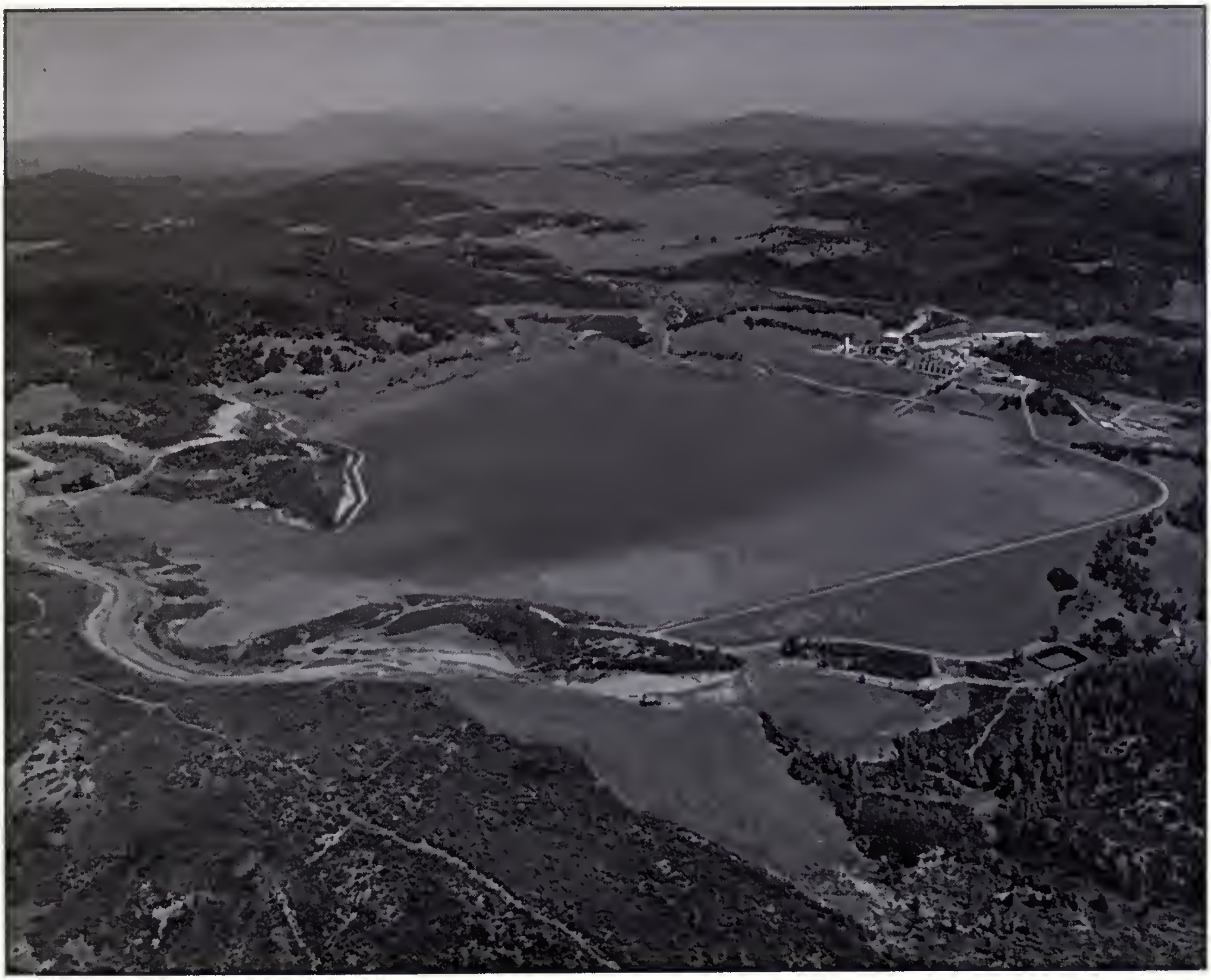
Krauss: Actually we had several when we had the road under construction. This was the winter of '83 and '84, so we had considerable--we would open sections of the road to construction at a time, so they'd work on a half a mile of the road and put in sediment controls and then do another half mile. But yes, we were also preparing the process area site, and we were also engaged in pre-mine stripping and building of some of the huge fills just west of the grinding building, which--we filled the whole valley. On top of which there was a little pond that we used to evaporate our treated sewage effluent, but it was basically a place to get rid of some of the material and to move the county road further away from the mine itself and create enough space for the crushing and grinding area.

And as luck would have it, we had a particularly wet winter that year. We had early rains. As I recall, in the month of October in 1983, when we began construction, we had nineteen inches of rain, which is almost the seasonal average. The seasonal average is twenty-five or twenty-six. And that was all in the first month. So it was a real scramble to make sure that all these construction activities were in compliance with our promises to the water board and the Department of Fish and Game, to get them to waive their normal construction prohibition.

But I think that it was in fact successful. We actually had commendations from the Department of Fish and Game in particular on the effectiveness of the sediment control activities that were implemented. I think most of the credit for that goes to Paul Morgan. Paul was just relentless in beating up on the construction managers and telling them, "No, you can't start that until you first put in the sediment control facilities" and "No, you can't do this until you put in this berm or that berm or this ditch or that ditch." He was quite diligent at that and quite successful at that.

Contrasting Construction of Two Similar Dams

Krauss: There were, I think, some interesting contrasts. Because we had so many different contractors and engineers working on the site, I learned a lot about construction management and in particular watching the construction of the dams, which were quite extensive components of the project. The first dam we built was what we called our M-1 sediment pond, which was a runoff collecting pond immediately adjacent to the mine. That was begun, again, in late 1983. Much of the construction was conducted during less than favorable weather conditions, and much of the time it got wet enough that the material simply couldn't be compacted and we had to shut down construction.



Tailings pond.

Photo by Manley Prim Photography, Inc

Davis Creek Reservoir.

Photo by Manley Prim Photography, Inc.

It probably would have been better to delay starting that project until the next spring. When you talk about things being over budget, engaging in winter construction, trying to expedite a project, always increases costs beyond what you would have spent doing that same activity in the dry season.

There was an interesting story that came out of that. I think it's one that John Ransone told. When the dam was partially constructed and we had this nineteen inches of rain in October, we actually had water accumulating behind the partially completed dam. One afternoon we had two inspectors on site. One was from the Division of Safety of Dams, and the other was from the Department of Fish and Game.

The inspector from the Division of Safety of Dams said, "You must release that water. You're not permitted to impound any water behind an only partially completed dam." And the man from the Department of Fish and Game said, "You must not release that water because it has a high sediment load in it and if you release it you'll violate downstream water quality standards and damage the riparian resource."

And John said to me--I think this was after a beer or two--he said he looked from one to the other, and finally he said, "Well, the warden from Fish and Game is carrying a gun, so I'm going to do what he tells me to do." [laughter] I always enjoyed that story.

I think the other thing that illustrates is, despite the tension that did develop between the engineering and construction group and the environmental group, that underneath it all there was a lot of good humor and camaraderie. I don't think anybody took it personally. We just had different objectives, and he was under a lot of pressure to do a lot of things in a short period of time, and I was under a lot of pressure to make sure that none of the agencies were offended by the way he did them.

Swent: You had started earlier to say that there was something that was just dumb. That was when the tape went off.

Krauss: I'm not sure what I had in mind then.

Swent: There were a couple of things, you said.

Krauss: Oh, yes. The one that really annoyed me the most was we had agreed, as part of our reclamation plan, to salvage and stockpile all of the topsoil from the construction areas and to have it available to use for re-covering disturbed areas during reclamation. One of the major topsoil requirements, of course, is tailings pond closure. We had scheduled the stripping and removal and stockpiling of all of the soil within the perimeter of the eventually full tailings pond.

At one point, I don't know if it was John Ransone or one of the other Davy McKee engineers, someone came to me and said, "Well, I think we can save some money if we just strip the topsoil from the area that will be occupied by tailings within the first two years, and then you and Jack, after you're up and operating, can go hire a contractor and have him strip the rest of the topsoil." I said, "You gotta be kidding. I know full well if it's not done now, it's not going to get done, and we're not going to build part of a pile and revegetate it and then build another part of the pile. We're obligated to do it. We're going to do it." We had quite a tussle over that. Ultimately I think Jack prevailed. Jack probably went to Bill Humphrey and prevailed on making sure that was done.

Swent: You talked about building the pile from the bottom up. How else could you?

Krauss: That was the waste dump. That's a different issue altogether. Yes, these are topsoil stockpiles, where we use scrapers to go into the area where we were going to place tailings and to take the top layer, a couple of feet of material, and place it into a stockpile that was protected with sediment control facilities and, in most cases, a collection pond and straw bales, and revegetate it and make sure the soil didn't wash away into the downstream.

Swent: For use years and years later.

Krauss: Years later. Now much of it has been used; not in the tailings area but the waste dumps have all been re-soiled with stockpiled topsoil, most of it from the footprint of the Davis Creek reservoir. So that also was stripped and stockpiled.

Swent: But they didn't want to do it all.

Krauss: Well, the suggestion was made that money could be saved if it was deferred until later. But I was absolutely convinced that to defer it would be to eliminate it. We had the equipment, we had the contractor, we had the scrapers, we had the ability to do it then, and to mobilize a new contractor and bring back that same equipment two years later was fairly unlikely in my view. Besides, I didn't think we could go to the agencies and persuade them to let us change the approvals to allow us to do that.

At some point or another you lose your credibility. You can go back only so often and make so many changes. Because we were fast-tracking it, we were making a lot of changes, and I needed to preserve whatever persuasion that I had, any capital that I had with them, to do those things that were of real consequence.

Swent: This critique of the project says they came in under budget, doesn't it?

Krauss: Well, you know, obviously--I don't know which budget. There were lots of budgets and lots of schedules, and they were always floating targets, and that was not in my area of responsibility, but I do believe that from Homestake's standpoint, the original Davy McKee cost estimate was $242 million, and the actual was $280 million or something, for the initial round of capital. That was not all in construction. That also was property acquisition and exploration and permitting. That was the whole capital cost prior to pouring the first bar of gold.

Redesigning Sediment Control: The “Rice Paddies”

Krauss: One of those changes where we burned up a lot of political capital was in Napa County. We had originally designed a sediment containment facility at the toe of the waste dump, as a single, large dam. For a variety of reasons, it became impossible or at least Davy McKee felt it was impossible to build it on schedule, and they were having difficulty in meeting the requirements of the Division of Safety of Dams in building the Davis Creek reservoir and the M-1 dam. So they felt that they could avoid the oversight of the Division of Safety of Dams if they redesigned the facility to five small dams, each of them small enough to be just below the threshold of jurisdiction of the Division of Safety of Dams.

Ultimately it proved to be a much, much better sediment control system.

Swent: These are the rice paddies?

Krauss: It's what we now call the rice paddies. But at the time it was a major change in design. I had just come back from a two-week vacation in Hawaii, the first vacation in two years, I think. And I think it was Bill Humphrey who said, "You've got to get the permits to change that design, and we need them by next week, Monday." I had basically three days or four days to do something that was really quite impossible.

I said, "All right. Are you sure that's what you want me to do?" And they said, "Yeah, that's what we want you to do." So I took the drawings down to Napa County, and instead of going to Jim Hickey, the planning director, to seek his approval--because I knew that his process would take several weeks--I went first to the department of public works and met with their engineers and got them to agree that the grading was something that would meet the building code.

And then I went to the county counsel, and I got him to agree that Homestake could enter into what was called a development agreement that would allow us to proceed with construction while the planning department was processing the permits, that allowed us to go ahead of actual issuance of the permits. It was something that was very rarely done and I think probably never done any more, and done only under extreme conditions.

But we did have an excellent relationship with the county counsel. I told him we really had to get this approval immediately in order to complete the construction before winter rains, and I needed his help. So he was willing to do it. So we had the development agreement, and we had the public works department approval, and then we called Jim Hickey and asked him to join us in the meeting. By then it was too late for him to prevent us from going forward. I basically boxed him in. It was the only thing I could do to fulfill the orders that Bill Humphrey gave me.

And I paid for that for the next four years. Later we'll talk about the Empire Mine tailings and the process of getting permits to bring those to the site and every other permit that I processed and every environmental compliance document that I provided Jim Hickey was given extra scrutiny because I had manipulated him into having to approve something that he would not have otherwise approved.

But I was told that it was necessary, and that was the only way to get the job done. The ultimate irony--

Swent: Why would he not have approved it?

Krauss: Well, he was the one that had to go through the process. You don't agree that you can build something and then investigate it. You know, you investigate it and then you approve.

But the ultimate irony was that once I had the approval, as requested, by next Monday, then Davy McKee and the contractor couldn't negotiate a price on exactly how they would build the construction of this new design, and the equipment sat there on the ground for thirty days, and that permit sat there for thirty days unused. And I had boxed Jim Hickey into a corner and burned up all of that political capital on a schedule that was unnecessary.

Swent: You could have had the month to work on it.

Krauss: Could have had it, and it would have made my subsequent relationship with Jim Hickey--ultimately we certainly worked it out. He understood what I was doing and why I was doing it. He knew exactly. He was a very, very astute man. At one point, I think he probably, at one of the political fund raisers or wine tastings where we chatted frequently, said, "Well, I probably would have done the same thing in your shoes, too. But--but nobody does that to *me* when I'm planning director."

There were other battles over building dams. I was starting to say earlier that I learned a lot by comparing the construction of the tailings dam to the construction of the Davis Creek reservoir. The tailings dam was engineered by SRK, and an engineer by the name of Don Poulter. And I guess because it was a tailings dam, everybody was willing to approach it from a fairly conservative engineering standpoint. But in truth it was designed as a water-containing dam. The water in the tailings is more difficult to contain than the solids. In effect, what you are designing is a water reservoir. It's the same design criteria that would be employed for building a water reservoir.

But Don took a very different approach in his relationship with the Division of Safety of Dams in that he met with them and discussed with them in advance of his design what they would be looking for in terms of design criteria, and what they would be looking for in terms of seismic stability criteria, and what sorts of demonstrations of seismic stability had to be provided in order for them to approve the dam.

And then basically, in his first set of drawings that went to the Division of Safety of Dams, everything that they expected was there, and their approval came very quickly, and the construction started very quickly. We were able to start and complete the construction of that dam during one dry season, the summer of '84.

In contrast, the Davis Creek reservoir--the selection of the design engineer kind of languished, partially because we weren't able to assure ourselves that we had acquired that property until late in the process, so nobody wanted to go forward. That was part of the Kauffman property that was late in being acquired.

But the d'Apollonia firm who had done much of our environmental baseline studies and our reclamation planning and a considerable amount of the environmental work did a damsite feasibility investigation. They looked at the geology of the site and evaluated its suitability as a dam location, and they raised a number of concerns about the strength and the nature of the existing--the ground, the geology at that site. It was highly fractured, porous rock. They suggested that a fairly conservative design, including quite a bit of pre-grouting of the foundation of the dam, would be required. I think the construction managers for Davy McKee felt that this was overly conservative. So d'Apollonia was never contracted to do the final design on that facility. Instead, it was assigned to Davy McKee, who assigned an engineer to the task who had, to my knowledge, never dealt with the Division of Safety of Dams before.

He operated from a very different philosophy. I think he was encouraged by the Davy McKee managers to operate from this philosophy, which was whatever you give the regulators they're going to ask for something more, so give them something less than you think is appropriate, and when they ask for something more, we'll come out where we ought to have been in the first place.

So when they submitted a design to the Division of Safety of Dams in California, which prides itself as being the premier dam engineering group in the world, and it had obvious deficiencies, they became very wary of dealing with this design and dealing with this company and dealing with this construction project. They later told me that they were concerned that the people engineering the dam lacked the competence to do so, and they assigned extra staff to the project to oversee it, to make sure that it met the seismic stability and safety standards that they insisted were appropriate for California.

So there were a lot of iterations. The plans went into DSOD, and they were rejected and they came back, and they were revised, and there were a lot of field decisions made. Rather than agreeing to do the grouting that had been recommended by d'Apollonia, we insisted that the grouting should be determined as a field decision based on what was revealed when the foundation of the dam was initially excavated. And once it was excavated, it revealed exactly what was predicted. So there was a long period of time when pressure grouting had to be conducted in the foundation before the dam construction could actually begin.

As a consequence of this less-than-ideal relationship, I guess, between DSOD and Davy McKee and their engineers, the dam was not completed in one summer. It was partially completed in its first year, and it had to be put into condition to overwinter, and then the construction company remobilized the following spring to complete the dam. It probably added half again or more to the cost of that facility over what it would have cost to have built it in one season. It cost considerably more than the tailings dam, even though they both contain almost exactly the same volume of fill.

I may not be entirely fair. Certainly there were different geologic circumstances, but knowing that the Davis Creek dam was situated in a more complicated geologic setting should have triggered, I think, a more conservative approach, not a more lackadaisical approach. We did in fact have the information from d'Apollonia that suggested that we did need to approach that in a different manner than we did.

But I think that kind of attitude, that the regulators are not engineers; they're always going to ask for something more; there was really an unspoken but very clearly demonstrated lack of respect for the government and the regulatory process that we were obligated to adhere to. And people aren't insensitive to that. There's no doubt in my mind that they all took exception to that.

Swent: You set up an antagonism from the very beginning, then.

Krauss: Sure. And the obvious response from the government side is to give your project lower priority than those you enjoy working on. It's just human nature. But I noticed in Harry's comments that he commented on the difficulty that we had had in dealing with the Division of Safety of Dams. I don't think anybody ever described to him the difference in the relationship of the tailings pond versus the Davy McKee-designed and -constructed reservoir dam.

But it was a component of the additional cost beyond what was projected for the project. So he's perfectly right in that.

Swent: I didn't realize that d'Apollonia was a construction or engineering group, too, that they could have built--

Krauss: They could have designed the dam and supervised its construction, yes. Actually, d'Apollonia was primarily a dam designing and constructing engineering firm from Philadelphia or Pittsburgh, from Pennsylvania somewhere. They had started an environmental arm, like many engineering firms did in the early eighties. But the parent corporation's primary activity was dam design.

Swent: It would have been logical to have them to do it.

Krauss: What do I know? I'm just an environmental manager.

I guess a couple of other construction comments and we could wrap up this section, but--

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Krauss: One of the major challenges of the project was to transport the autoclaves from their point of construction, I guess in Germany, then lead lined in Amsterdam and shipped to Oakland and barged to

Sacramento and then placed onto custom-built slings on many, many wheels and transported along the freeways up to the site.

This is another area where Paul Morgan really excelled because these were oversized loads that had to be hauled in California according to very strict Department of Transportation and California Highway Patrol standards and restrictions. Again, these were bigger than anything they had ever dealt with, so they were very worried and wary about it. They put some substantial restrictions on the movement of these things. I think they could only move during daylight hours and not on weekends because they were afraid that it would block up traffic.

It actually took seventeen days to transport the first one from Sacramento to the site under those standards. Paul was able to, during the course of that, create relationships with those people that satisfied them that those restrictions were unnecessary, and so the last two came--I think the next one came up in five days and the last one in three days. It's just another example of how dealing with people can facilitate moving the job along.

It was technically a real complicated matter to move--I guess they were 400,000 pounds each--on the roads, without exceeding the weight limit on any one axle. They were big enough that they didn't fit well over the hills and rises or around the corners, so it was an interesting experience.

Swent: Are they still there?

Krauss: The autoclaves are still there, yes.

Swent: But they will eventually have to be taken away, I guess.

Krauss: Either that or I'll get them declared a historic resource, since they were the first ones used in the U.S. for gold processing. That may save us some money in the long run.

Swent: They haven't used them for a while, though.

Krauss: Not since '96, right. There was some talk of moving them to a new Homestake project in Chile. There's a possibility that they may have use down there.

The other area of battles that I had with Davy McKee was on their, again, trying to cut corners. They kept insisting that somehow the revegetation should be done at a lesser standard than was otherwise required. Again, Paul was really instrumental in helping me in fighting and ultimately winning those battles. It was kind of ironic. In the end, I think--in fact, I know--that in retrospect many of those same Davy McKee folks that I battled with came around to agree that what we had done was the appropriate way to do it.

In fact, I had a conservation with Klaus Thiel, who had been Davy McKee's project manager, in charge of the whole effort, on behalf of Davy McKee. He had just come back from Indonesia, where he had been working on a project. This was some five or six years after startup, and he came back--he brought some potential clients to visit McLaughlin and see the autoclaves. I ran into the hall and he put on this big smile and, "Boy, how are you? I'm glad to see you." And he says, "You know, Krauss," he said, "when we worked together I thought you were a royal pain in the ass." And he said, "I could use somebody like you now." [laughter] "I could really use somebody like you now."

There was some acknowledgment, later, down the road, that--I guess on any project--it's natural that these kinds of tensions develop and these kinds of conflicts develop and get kicked upstairs to the managers, and the managers decide how they're going to be resolved. Fortunately, I think Jack Thompson and Bill Humphrey and the other folks at Homestake were really committed to assuring that our environmental record was sound. I don't really think there were any of those battles in the long run that we lost that compromised the project in any way. But it was a busy eighteen months to make sure that we stayed on track.

We did have an excellent startup. The company brought on the operations employees quite a number of months before they were actually required to run the plant, and provided them with very comprehensive training. We had autoclave operation center and control center simulators and so they were able to simulate the operation of the autoclaves and simulate their response to upsets. It really was an excellent, smooth startup.

On the pressure oxidation side of the project, it was kind of another irony, I guess, is that the conventional parts of the project--and I think in Davy McKee's project critique they acknowledge this--the primary crusher, for example, was just a terrible design, and every mine has a primary crusher. You would think that all of the wrinkles were ironed out, but for whatever reason, it was placed deep in the ground in a hole, where the spillage was inaccessible by heavy equipment, so the only way to clean it out was to send day laborers down there with shovels and shovel all the spillage onto a belt. It was very difficult to maintain.

Whenever it rained, it got plugged up. Or whenever it got oversize material wedged into the jaws in one way or another, it got plugged up. I guess there were some interesting battles between the mine department, who felt the best way to resolve these blockages was to go in there and drill a hole and put some dynamite in it and blast the offending rock, and the guys responsible for maintaining the equipment thought that that was a little abusive! Ultimately that facility was replaced with a gyratory crusher, when we doubled the throughput and built the oxide circuit.

Pouring the First Gold Bar: Krauss not Invited

Krauss: I did have one disappointment, I think, at the end of that construction process. There were a group of people invited to observe the pouring of the first gold bar, and I was not included in that group. I think that was the first time I really began to ask myself whether or not the company's commitment to environmental issues was as deeply felt as it was proclaimed to be.

Swent: You were still peripheral.

Krauss: Yes. All the construction engineers were there, and Bill Wilder was there and Harry [Conger] and Bill [Humphrey] and Jack [Thompson] and Klaus [Thiel] and a number of Davy McKee people. I don't know. Maybe I had an inflated view of my contribution to gaining the success of that day, but it seemed--I was disappointed, for whatever reason.

But it didn't last long. A few months later we had a public celebration and dedication of the facility. You were there for that. You were there with Sylvia [McLaughlin].

Swent: September '85?

Krauss: September '85, yes. And Harry said some very kind words about my contribution to the project at that event, so I kind of forgave him. But sometimes I still regret not having been included at the first pour.

Swent: It is too bad.

Krauss: And maybe that's a logical stopping point. That gets us through the construction phase. And then we could talk again about ongoing operations, and I would like to talk more about Phil Barnes and his contribution to the ongoing monitoring program.

Swent: It was that inauguration in September of '85 where this idea of an oral history program began. We drove the Fuerstenaus up that day, and Doug was talking about what a historic event it was.

Krauss: He was very supportive of it, wasn't he?

Swent: It was his idea.

Krauss: That's wonderful. Well, that's interesting. Things come full circle, don't they?

Swent: Yes, that's right. And that was a pretty exciting day.

Krauss: Yes. In fact, we can start with that the next time and describe that in some detail because there were--

Swent: This McLaughlin Construction Company--was that named, then, for the McLaughlin Mine? I had never known that.

Krauss: Yes, that's my understanding.

Swent: It was from Utah, wasn't it?

Krauss: It was a company--I don't know whether it was Peter Kiewit--it's one of the big, major construction companies, and I don't know whether they incorporated or established a business entity specifically for this construction project.

Swent: I didn't ever know that.

Krauss: That was my understanding. You can check with other people. I don't know that. Again, I wasn't involved with that end of the process, but it was my recollection that it was a joint venture between two of the major Western states contractors, and specifically established to bid on a portion of the McLaughlin project. The other was called Argee, and again, I don't know whether that's a one-time construct for the purpose of that project or whether it's an ongoing company. I got the sense that there were a number of companies that would form joint ventures in order to bid on different construction projects, depending on what equipment they had available and what personnel they had available, and work jointly on these things.

"Care and Feeding of the Network"

[Interview 4: October 26, 2000] ##

Krauss: We left off talking about permitting issues. I guess in chatting last night there were a couple of permitting matters that I had overlooked yesterday that I wanted to be sure to have included.

One of them was a discussion of the company's response to the early difficulties that we encountered in Yolo County, when it became obvious that the county was reluctant to go forward with certifying the EIR, recommending its certification, until they had gone through a number of other hearings and exercises. Following one of those hearings, which I think probably our management found very frustrating because they sat through five or six hours of what, from their point of view, was pretty irrational comment, although I'm sure it was personally and socially fulfilling to the commentors, we had a meeting in San Francisco.

As I recall, Harry [Conger] was there and Jack [Thompson] and Denny Goldstein and Bob Reveles and Dave Crouch and myself. That may have been the group. There may have been one or two others in there as well. The meeting started out with everybody expressing their incredulity at the proceedings the night before. After about ten minutes of what might be characterized as whining, Harry kind of raised his hand and said, "Wait a minute," he said, "let's sort this out. He said, "I want to know one thing: Is this problem Mother Nature or human nature?"

And we all looked at each other, and I think Bob Reveles spoke up first and said, "Well, it's clearly human nature." And I thought that was a very insightful moment, kind of a personalizing moment that Harry brought to the table. It was real clear when we sat there and thought about it [that] we weren't deficient in our technical evaluations. There was no benefit to providing more scientists or more engineering or more technical assurances. What we were really dealing with was a psychological, sociological, political issue, which was clearly human nature.

Swent: We should mention this was the Capay Valley group, wasn't it?

Krauss: Yes, there were a few people in Capay Valley--it was later characterized as being--I think people called it the Silly Seven. It was ultimately a very small group of people who were philosophically opposed to mining, period, regardless of its location or circumstance or consequence.

Swent: So it was human nature.

Krauss: But it certainly was human nature, and Harry turned to Bob Reveles and said, "Well, then, Bob, this is your"--Bob was our VP of governmental affairs, I guess was his official title, but he had quite a history of and a skill in understanding the political process. He had served in Washington as an aide to--was it Mo Udall?

Swent: I think so.

Krauss: I believe it was. So he intimately knew the political process on a national scale and had a wonderful personal instinct for understanding organizing and political consensus and public perception on these kinds of issues.

So we sat down with Bob, and I believe it was he who suggested that we rent an office in Woodland and open a storefront and have a presence in the community. We had over the years, over the two or three years of pre-permitting and permitting, begun a newsletter, and we developed a mailing list of anyone who inquired about the project or anyone who was a potential vendor to the project or a neighbor or all of the political folks, any of the decision makers, anybody that might have an interest in the project. We would just add them to the mailing list and send them the newsletter.

As we opened the office in Yolo County, we expanded the outreach effort to include more Yolo County citizens in that. We talked to the various Rotary clubs and Chambers [of Commerce]. And eventually we had a mailing list of over 7,000 people who were receiving that newsletter on a regular basis.

In the office we set up our topographic model. We had a topographic model of the area, including the mine and the mill and the tailings pond. It was portable. It divided into four sections, and we could throw it in the pickup truck and move it around. So we set that up in the middle of the floor and put up some bookshelves and put in all of our EIRs and environmental documents and technical studies and maps and drawings and pictures on the walls, and we hired a receptionist who had formerly been the secretary to the county sheriff, Katie Knisley. She was a wonderful, wonderful woman. She knew everybody who ever lived in Yolo County, and they knew her. So she staffed the office, and anyone that had any questions, if she couldn't answer them, she would put them in touch with one of us.

When we had meetings in Yolo County, we would be there and have a presence in the community. Gradually, over time, we began to be acknowledged as having a presence in the community. I guess it was shortly before the board of supervisors had to take action on the permits, Bob decided that we should have a reception, so we sent out invitations to all 7,000 people on our mailing list, or at least that portion of them that were in Yolo County.

He hired a mariachi band and a caterer and got some wine, and we had a reception. The office was located on Main Street, just a couple of blocks from the courthouse and the board of supervisors' chambers and the county offices. The landlord was Tom Stollard, an attorney in town who had just bought this building. It was a historic building, and he had done a lovely historic renovation on it, so it had big fancy staircases and marble floors and open courtyards. It was an ideal space to have that kind of a social event.

Tom, by the way, is now a member of the county board of supervisors. I just saw him the other day, and he has been very complimentary of the work that we've done and the success of the project.

But we threw open the doors, and people came. Over the course of the evening, I believe all five of the members of the board of supervisors showed up. It was real clear to them that there was a substantial constituency in support of the project, and it was clear to the community and it was clear to the press, which was the demonstration that needed to be made.

Bob and I used to talk about it. These local permitting decisions--really almost all permitting decisions--but particularly the local permitting decisions are ultimately political decisions, and one can't expect a member of the board of supervisors to support our project, to vote on behalf of our project if in fact it would cost them their seat, if they would be un-elected to the office at the next election. So obviously the only way to ensure a positive decision was to demonstrate to them that a majority of their constituents were in support of our project.

Over the period of time that we maintained the office and worked in Yolo County and worked with the environmental groups and worked with the university, it became very clear, in the press and to the decision makers, that the opponents of the project were really very few. When the Sierra Club, when Ada Merhoff, the conservation chair of the Yolo-Solano, or Yolano, chapter of the Sierra Club, endorsed, in effect, the project at the planning commission hearing, it became evident to the community that those people opposing the project were even more radical than the Sierra Club might be in opposition to the project, and that in effect politically isolated them and clearly demonstrated that they were a tiny minority.

So it was really fairly easy for the board of supervisors to make a positive decision once that political demonstration had been made clear to the community. And I have talked to other groups about that, and a lot of my colleagues in the mining industry bemoan the fact that they have difficulty obtaining permits from local government. But it really isn't rocket science. You can't expect anybody to fall on their sword on behalf of your project.

The other side of the coin is if you do in fact have a majority of the constituents behind you, they can't vote against you, either. Lobbyists talk about providing political cover or whatever, but it's just a matter of counting noses and making sure that more of them are pointed in your direction than your opponent's direction.

Swent: But you have to make that effort.

Krauss: You have to make that effort. Not only do you have to communicate with folks adequately so they understand your point of view, but you have to give them an opportunity to demonstrate their support. And Bob Reveles was the master.

I might also make just a quick comment with regard to the Sierra Club commendation. I think that ultimately was viewed as being controversial in the local community, but--

Swent: I have heard that Ada acted on her own?

Krauss: Well, everybody has their own point of view on those things. Very early on, we had contacted all of the environmental community. I think the first task Jack assigned me to do in the summer of 1981, when he came on board, was to make a list of all of those organizations and individuals with whom we would have to establish communication in order for the project to move forward. I still have that memo somewhere in my files. It's kind of fun because it was an eight- or ten-page list!

When I delivered it to him, he threw up his arms, and he said, "Well, this is impossible! There's no way we can deal with all of these people."

And I said, "Well, there's no way we can not deal with all of these people because they're all going to have a say before the time is over"--by the time you add up the media and the environmental community and the property owners and the neighbors and the regulatory community, in each of three counties. It was a formidable list. And ultimately we did communicate in one form or another with all of them.

Swent: There was probably a lot of overlap.

Krauss: Oh, yes. Well, to some extent, but things like the newsletter were very effective. I've always characterized it as kind of the care and feeding of the network. You identify the members of that network, and then there are different techniques. In modern days we use e-mail newsletters or whatever, but the written newsletter and the periodic community meetings and information in the press. And we have maintained that network to this time. We didn't just let it die at the end of the permitting.

We had our dedication ceremony, we've had millionth-ounce celebration, two millionth-ounce celebration, and we've always invited many--not the whole 7,000 on the list, but 1,200 people got invitations to each of those events, all of those people who in some way were active in the approval of the project. That maintained their allegiance to our cause, really, and we have maintained that network right up to now, until we're approaching closure.

So the care and feeding of the network is an important element in any relationship with the community, any industrial project's relationship with the community. And it requires time and effort and cost. It's not one of those things that when you start downsizing that you can afford to shed, though generally it is eliminated early in the downsizing effort.

But among those groups was the Sierra Club, and we made a particular effort to talk to them because they were in a position to be effective adversaries. Ada and--I've lost the name of her partner--there were two women who were members of what was called the Conservation Committee of the Yolo-Solano Chapter of the Sierra Club. And I met them at an early information meeting and invited them to the site, and we spent a whole day touring the site and talking about the environmental issues related to the project and the role of mining in our society. And we had a real friendly relationship. This was a very congenial conversation, even though they were very skeptical about the point of view that I represented.

But I promised them that we would provide them copies of all of our environmental studies, and we did that. Every time we did a series of studies on potential tailing pond sites or permeability studies on the underlying geology or rare plant studies or studies of faulting in the area--everything that we did, a copy of them went over to the Sierra Club. And they in turn developed a network of technical support on campus at the university in Davis.

Swent: Was Ada connected to the university?

Krauss: No, she wasn't. She has an interesting history herself. She just passed away of cancer a few years ago. But she and her husband retired here from Hollywood. He was involved in the technical side of movie production. I don't know whether it was sound or editing, but apparently he had been quite well known in the technical side of movie production. Very shortly after they retired to the Davis community, he passed away and she became very active in the community in social efforts, housing for homeless, and she compiled a history of the Capay Valley that is quite authoritative. And she promoted development of the Blue Ridge Trail on behalf of the Sierra Club. She had her finger--sort of like Sylvia McLaughlin, she had her finger in a whole lot of things and was well respected in the community.

But they reviewed all those documents and had access to all of this information, and ultimately, when it came time for the hearing, they wrote on behalf of the chapter of the Sierra Club, and my understanding was that they were authorized to do that because she was the chairman of the Conservation Committee, and it was the Conservation Committee that had the responsibility for establishing positions on permitting issues in the community.

I have no idea to what extent she communicated with other members of the club, but she was certainly clear in her mind that she was authorized to make a public statement on behalf of the group. And the statement was interesting because it didn't endorse the project, really. It said that "we have evaluated the environmental matters relating to this project, and we have decided that the engineering and the environmental engineering is sound. We have taken all of the documents and had them reviewed by"--

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Krauss: "--people whom we believe are qualified to review them and whom we trust, professors on campus, and nobody has been able to point to any inadequacy in the engineering and design and environmental assumptions that have gone into the project."

"We considered the role of mining, in particular gold, in our lives and decided that we personally and as a society do need gold, that we use it in our communications, and we use it in our computers and have it in our teeth." It was really cute. She said, "And some of us really enjoy wearing jewelry!" [laughs] And she said, "Given that we use it personally, if we were to oppose this project we would be in effect endorsing the production of gold elsewhere under circumstances that would be less environmentally and socially favorable. And therefore the conclusion was we choose not to oppose this project." So it wasn't an endorsement to support it, but they said, "We choose not to oppose this project."

I was flabbergasted. It was very unusual that the Sierra Club would do that. It was picked up by the local newspaper and discussed in the community, and I'm sure there was an adverse reaction to Ada personally for having done that. Certainly there were lots of members of the Sierra Club who thought that under no circumstance should the club endorse that kind of a project, or even state publicly that they would not oppose that kind of project. But she did. And I believe--I know I've got a copy of the letter that she submitted to the planning commission in my files. I can certainly provide that to you. But I immediately--I guess Jack must have been there, and Jack and I immediately told San Francisco, and San Francisco got excited about--what had been a decision not to endorse became a decision to support.

And Bob Reveles, I think--Bob or somebody--somebody got a hold of the letter. I believe there was a senator from Nevada by the name of Santini? Was he--Was he related to the Homestake board or something? Anyway, we got a hold of Santini, and Santini took the thing to Congressman Vic Fazio, who represented that district, and persuaded Fazio to insert it into the *Congressional Record*. And so there's this statement in the *Congressional Record* from the Sierra Club Yolo-Solano Chapter Conservation Committee that says that not only do they choose not to oppose the project but that Homestake had demonstrated unusual sensitivity to the concerns of the community, which was unusual for a large mining company and should be commended for that effort.

Certainly the company has made maximum use of that.

Swent: It's interesting because gold is a little harder to defend than some other minerals.

Krauss: Particularly in Davis, they had in mind some of the social issues in South Africa at the time, where there was a boycott ongoing, as well as the environmental issues. But it was certainly a well-reasoned conclusion, and it was clearly stated what the basis of that conclusion was. But I'm sure there would never be a consensus of opinion in the community that that ought to be a broadly adopted position of the environmental community; let's put it that way.

Swent: It was a great coup for you.

Krauss: Well, it wasn't just me; it was everybody. For the effort, yes, for the process. I think the process of engaging the community openly in all of the activities of the project was clearly essential, and that's one demonstration of it.

Permits for Air Quality

Krauss: I also wanted to say a word or two about Dave Crouch in the context of the permitting. Dave was in the San Francisco office. I believe his title was director of environmental affairs, something like that. But he had really handled the environmental issues at McLaughlin before I came on board in '81 and had initiated some of the early environmental feasibility and permit feasibility studies and had brought on board some of the early consultants: d'Apollonia, who did the reclamation planning and the environmental baseline work.

I think it was certainly Dave's influence that encouraged us to utilize local talent. The Native Plant Society was involved in our rare plant surveys, and a local consultant who knew the area well personally did the official plant surveys. That was one of those issues that Dave and Langan [Swent] at that time were very sensitive to. There was concern that we had found this ore body right in the middle of an area that was populated by rare and endangered species that had been sitting there forever as a consequence of the serpentine soils.

They did a wonderful job of confronting that issue without hiding it. Very quickly somebody noticed that for some reason the distribution of these rare plants was most dense close to roads, which kind of suggested a sampling bias. I believe it was Langan that authorized an extended survey of over thirty thousand acres for these plants, at which time it was clearly established that they weren't rare at all! [laughs]

But Dave was also involved in--he really handled the air quality permitting, and that was a complicated matter because it involved EPA oversight under the Clean Air Act and three different air districts and some complex modeling of emissions based on modeling technology that wasn't well developed or well accepted at that time. Most of the air quality models were gas dispersion models, and we were talking about a particular dispersion model that has various fallout factors.

He worked with a technical consultant by the name of Kirk Winges and a San Francisco law firm, a lawyer by the name of Mark Mihaly. They were able to persuade the Bay Area Air Quality Management District that the model that Kirk had developed that included factors for the deposition of particulates in the vicinity of the pit was an acceptable model, and they were able to reach consensus on the emission factors and develop a technical document that supported the issuance of the permits that we needed, the air quality permits that we needed.

It was difficult because the air quality constraints in California and in the Bay Area Air Quality Management District in particular were severe, so severe, in fact, that even though we could permit at the mine and the mining activities, we had a lot of difficulty permitting the emissions from generators to run the crushing plants and screening plants to produce aggregate material from the overburden during the construction period.

Actually, some of those facilities we had to move across the county line into Lake County in order to get them permitted. That was one of the permits that actually went to appeal. There was a woman who had property in Capay Valley, who became engaged--I believe her name was Andrus, and whether she was related to Cecil or not, I don't know. And she has since disappeared from the scene. But she lived in San Francisco and owned some property in Capay Valley, and she became engaged in the air quality issue and actually filed an appeal of the issuance of our permit.

There were a number of issues at stake. One was whether or not the model was appropriate, and another was whether or not the emission factors were appropriate. They contested the determination of what points of compliance should be. There's a public road that runs right through the middle of the site, between the mine pit and the waste dumps, and they asserted that that road, because it was open to public access, should be the point of compliance.

Dave and Mark were able to argue that, because no reasonable human being would live in the middle of the road for twenty-four hours a day for seventy years, that the factors that applied to determining the point of compliance weren't relevant to a road where people's occurrence was transient. They prevailed on that. But it did go to appeal before the hearing board.

Again, one of those wonderful ironies. The outcome of the appeal was to, from our standpoint, make the terms of the permit much more realistic than they had been as originally drafted. There was an acknowledgment that compliance was not required at the road. There was an endorsement of the modeling that we had done and the emission factors that we had chosen. It turned out very favorably, and I think all due to Dave and Mark's efforts.

He also did a lot of work for the company on the national regulatory scene. For many years he was chairman of the National Mining Association, then the American Mining Congress Waste Committee--Solid Waste Committee, or Waste Committee. But he was personally very instrumental in the EPA's ultimate decision that mine waste would not be regulated as hazardous waste but rather as solid waste, which ultimately I'm sure has saved the industry collectively many billions of dollars. I think his role in that has largely not been acknowledged or has been overlooked.

He was also involved in mining law issues. I know as early as 1981 or '82 he and I had discussions about the politics around the General Mining Law, the 1872 mining law, the various efforts to, quote, "reform" the General Mining Law. He and Bob Reveles both were proponents of taking a proactive approach, of identifying those areas where we could amend the law that would satisfy certain public concerns and promoting change in the law in order to preclude unacceptable change at a later date.

He actually shared with me from his files as early as 1981 a draft of legislative language proposed to amend the General Mining Law. But to the extent that he and Bob promoted that effort, I think both of them were soundly rebuked by the more conservative elements of the mining industry, particularly the copper companies, who took the position that "we've lived with this law for all these years, and it works fine, and there ain't nobody gonna make us change it."

And who knows? Maybe they're right. Here we are, almost twenty years later, and they have still fended off any fundamental change in the law. We sure spent a lot of money and a lot of effort and had a lot of battles over twenty years to maintain that position that in my personal view could have been avoided if we had taken the initiative and promoted our own version of change early on.

John Livermore and I used to talk about that, too. John I think was largely rebuked by the rest of the industry because he was very forthright in expressing his support for being proactive on that issue. I know when somebody from Kennecott, I think--I mentioned that I had run into John Livermore, and his characterization of the man was not complimentary. Their view was that somehow he was some heretic, some environmental collaborist or something like that, and not to be trusted. But that's kind of a side issue.

But I do think it's important that Dave be acknowledged for the contribution that he made to the whole industry and his work on behalf of particularly the classification of mine waste and other national issues.

Startup and a Dedication Ceremony

Krauss: I guess moving out of permitting, I spoke a little bit about the operation's startup, which did in fact move very, very smoothly, in part because such excellent engineering had gone into the novel portions of the plant, the autoclaves and the related portions of the plant, the CCD circuit, where the discharge material from the autoclave was washed. There was really quite smooth, excellent production through the plant from the beginning without any dramatic disruptions.

There were some surprises elsewhere in the plant. I mentioned the difficulty with the primary crusher, and there were some surprises in the carbon-in-pulp circuit, the CIP circuit, where the viscosity of the autoclaved ore was more than had been anticipated, so that in order to move it through the screens it had to be diluted and that in fact reduced the throughput, and there needed to be quite a little bit of attention paid to that.

Swent: And that meant more water.

Krauss: It meant more water, and ultimately it led us to amend the permits to allow us to recycle water from the tailings pond back to the grinding circuit, which--yes, I guess water balance and water conservation and water management at any mine site is a critical issue, and certainly there was a huge, huge effort on the part of the process engineers and the metallurgists to get a handle on that very issue.

That of course was complicated by the fact that shortly after startup we went into a seven-year drought, so not only did we need to recycle water in order to remove it from the tailings pond, which would have otherwise occupied the volume of the tailings pond, we needed it because we didn't have enough fresh water to operate without the recycle.

At the end of the last summer of that drought, we were down to, as I recall, something on the order of 1,100 acre feet of stored water in a 6,000-acre-foot reservoir, and only a small portion of that was actually recoverable for process water. And then, miracle of all miracles, the next winter was a heavy winter. The reservoir filled back up again, and that uncertainty was relieved.

The recycle was not an easy permitting effort because previously we had promised Solano Irrigation District and the water board that any material containing cyanide would be contained within the tailings pond or the process plant, and now we were taking water from the tailings pond that contained measurable amounts of cyanide and pumping it five miles down the slurry line back to the grinding circuit and reusing it. So we had to satisfy everyone that we could do that in a manner that would not present a threat of release to the environment.

But it worked out.

Swent: So that meant new pipeline, then.

Krauss: Oh, yes. We added new pipes, new pipeline. Initially we had a spare slurry line that we were able to employ in that regard, but subsequently there were corrosion issues in the pipelines, and all of the pipelines were replaced with above-ground pipelines. We finally put in a twelve-inch line all the way from the tailings pond to the grinding mills to carry that recycled water and help maintain that water balance.

The startup was kind of capped with a community dedication ceremony. I think the logistics of that were interesting. We had a two-day event. The first day we invited all the government officials and all of the construction engineers and technical consultants and folks that had a direct hand in the project. We had put up a big tent at the picnic area and the core shed area and had displays that described how the process worked, with pictures and diagrams.

If I can remember, I think we had the process model under that tent, too, at that time, the scale model of the extraction plant. One of the exhibits was one--I wish we could find a picture of it--I think it was one of the Hill & Knowlton guys had the idea to take some plexiglass and make a big column and fill it with all of the permitting documents, which came out to be eight or ten feet tall. And there's a wonderful picture of Dennis Goldstein standing next to this tower of paper, all of which at some point or another he had read to make sure that it was legally acceptable, I'm sure. I have seen that picture of Dennis standing next to it with a big grin on his face.

Swent: That was a very, very vivid demonstration of the permitting.

Krauss: And then we had an official dedication at the truck shop and the first blast, and Sylvia unveiled the plaque of Donald McLaughlin, and Harry spoke to the group, and Jack spoke to the group, and we had a representative of each of the three counties speaking to the group. None of these things were as simple as they should be. And it was Harold Moskowite from Napa County, and it may have been Walter Wilcox from Lake County. Yolo County had an election between the approval of our permits and the dedication, and Twyla Thompson, who had been chairman of the Yolo Board of Supervisors, had not run for reelection and had been succeeded by I believe it was a man by the name of Ernie Pfanner. Twyla and Pfanner were bitter enemies, bitter political enemies, and Twyla had actually legally challenged his qualifications to run for office on the grounds that his residence was not in the district that he chose to represent.

It was really kind of an interesting story because his farm was in both counties, in both districts, but his house was actually in somebody else's district. So in order to run in the first district, he bought a mobile home, and he set it up across the road, in the first district, and claimed that as his place of residence. People used to tell jokes about seeing him in the middle of the night in his pajamas, running back and forth from his mobile home to visit his wife. I don't know whether it was true or not, but it was a very, very bitter relationship.

I talked to Jack about what to do, and Twyla was a very, very helpful person, not that she unreasonably supported our efforts, but she was very candid in telling us that "in order for me to support your project, I need you to deal with these people and satisfy these people's concerns." She was very, very candid in that regard. And I felt very strongly that we had a duty to recognize her and not Ernie Pfanner as being the person that had been involved in that effort.

So we invited her to speak and not Ernie. We invited him to come. He did show up late in the afternoon, and he berated me for having had Twyla there instead of him. I threw him in the car and I gave him a personal tour and sent him home, but it was always a sore point with him, kind of like the Napa County sheriff who got left off the list.

Swent: But she had been there all through the process.

Krauss: She had been there all through the process, and there was no way--I told Ernie at the time--I said, "Listen, this is just a demonstration of the company's loyalty to the people with whom we work. Four years from now we will be just as loyal to you as we are to Twyla today. You can be sure of that." But he wasn't persuaded.

The second day we had the public invited. I don't remember the total number. It seemed to me it was somewhere around 7,000 people showed up. We had the whole meadow area north of the core shed opened up as a parking lot, and we still had the thirty-two buses that we had used for employee transportation during the construction period, so we hosed all those out and put them on the line. They were all lined up along the slurryline road, and we had everybody that could speak English on our staff and had any kind of social skills at all to be tour guides, and had one in every bus.

We just ran them in a circle. They would stop by the tent and pick up a load of people, and they would go out to the mine and drive around the mine and drive back up through the process plant and come back down the slurryline and unload people. We had refreshments and brochures and newsletters and hats. It was a very, very well received celebration in the community. It kind of, I think, set the tone for our presence in the three-county area from that point forward. It was clearly an acknowledgment from the company to the community that we were thankful for being welcomed into the community.

I think the only other demonstration I can think of that was that positive, that real positive demonstration of community acceptance, was in the first--it would have been the Christmas of '82, I think it was. The Lake County Economic Development Board, which included Dave Hughes and Pam Lubich, two or three people prominent in the Lake County community, who had been appointed by the board of supervisors to be the community development board or the county economic development board.

And they gathered together Christmas baskets with local Lake County products. They had pears and walnuts and wine and whatever and put Christmas ribbons on them, and they made enough for everybody in the San Francisco office, and they drove them down to San Francisco, and they had this gathering of all the San Francisco personnel in the board room, and they handed out a Christmas basket to everybody and said, "We really want to welcome you to Lake County. We're really excited about your joining our community."

Swent: That's a real tribute.

Krauss: That was a real nice event.

Swent: I had not heard of that. That's wonderful.

Krauss: Yes. And it [the dedication] was reported in all the newspapers. There were people from Solano County and Sacramento. And to this day I see people in the community wearing those hats that we passed out twenty years ago.

Swent: Were those the yellow ones?

Krauss: Yes.

V CONTAINMENT AND RECLAMATION

Excellent Process Operators and Maintenance Group

Krauss: I think, looking back at that period in time, McLaughlin really excelled in a number of areas that were never really clearly acknowledged, at least not outside of the industry technical circles. Certainly the skill of the process operators was incredible. Here we had folks that had never worked in a mine before, who were brought in and trained and worked under the direction of a number of metallurgists who were moved into the operations side of the project to run an autoclave process that was novel, was unique. And they did it with great skill and success.

Swent: And safety.

Krauss: And safety. In contrast to later, other autoclave operations, where safety issues were so prominent that maintenance employees would not work on their autoclaves without shutting them all down first. Where at McLaughlin we had three autoclaves in parallel, and people were quite comfortable working on one of them out of circuit while the other two continued to operate. So that was an important accomplishment.

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Krauss: Another area that really excelled and, again, probably didn't ever receive the acknowledgment it deserved was the maintenance group, in particular a guy by the name of Ivan Markland, who headed up that, who was the maintenance superintendent or maintenance manager for the process area. With the autoclaves being a new technology, keeping them in operation was important to the economic success of the project, and keeping them in operation means maintaining them in a way that prevents them from failing.

They had a program of identifying those areas that caused downtime and analyzing them and improving their design and upgrading the materials. They introduced the use of ceramics in place of titanium in agitators that allowed them to extend the hours of operations between normal maintenances. They experimented with various brick lining methods and mortars, and ultimately they achieved an operating availability of that equipment that has never been achieved by anyone else in the industry.

Another example: in the grinding mills, the replacement of liners in grinding mills in many mines requires taking the mills out of production for a period of several days. Ivan and his engineers--it was Bilhartz and Brown--were able to design liner systems so that they could be replaced in thirds, instead of having to replace the whole set. So they were able to go in, shut down the mill for an eight-hour period, replace one-third of the liners, and start it up again. During that eight-hour period they had enough prepared or already-processed ore in surge tanks to continue to operate, so they could accomplish this mill liner changeout without any interruption in production. I recall over the years that a number of other companies sent their maintenance people through to visit with Ivan and his people and try to understand how they were able to achieve that.

Jim Fleming was the maintenance manager in the truck shop, with responsibility for maintaining the truck fleet and the loaders and all the heavy equipment. Again, it was an exemplary system. They developed, in cooperation with Caterpillar [Company], monitoring and maintenance record keeping, computerized record keeping that allowed them to optimize the availability of that equipment and minimize the cost of keeping it on the road. It was really another outstanding accomplishment.

Steve Smith was the safety manager. I guess the bottom line is that the safety record at McLaughlin was always among the best in the industry. He was a hard-nosed, dedicated safety guy, and he developed a strong safety program and insisted on a zero tolerance policy, that people had to follow the rules. In a sense, he was the bad cop to Jack's good cop. He held their feet to the fire, and Jack encouraged them to perform. But as a result, the safety record there, as you go back through the years of operations, is clearly consistently one of the best in the industry.

Jack Thompson's Effective Management Structure

Krauss: The other I think remarkable accomplishment at McLaughlin, and I have never heard anybody at least formally acknowledge it--I've had a lot of discussions with a lot of the people who had worked there over the years about it, and that's the management structure, the relationship among the managers that evolved, actually as a result of I think Jack Thompson's management style. Jack always was very encouraging to his employees. He kind of set the relationship as, Well, I hired you because I think you're the best person available to do this job. Now go do it. And I'm not going to get in your way. Your real obligation is to keep me informed, tell me before the train comes off the tracks. I don't want to know if you had a problem after it has happened; I want to know before it has happened. But go and solve that problem and manage your responsibility.

It was a real flat organization. We had tremendous communication horizontally. I didn't really recognize how unique this was until I spent some time at some other mining operations, including Homestake's mining operations. But if we had a problem between the environmental group and the mining group, if the waste dump construction needed to be adjusted or we needed a drainage ditch or we needed erosion control or if they weren't properly implementing the dust controls, my environmental staff would talk to the foreman. He talked to the people in the pit who were actually controlling the water truck and saying, "Hey, we need more water." Or "We need you to put a ditch here" or "We need you to put a ditch there."

And after the problem was solved, he would let me know, and I would let the mine manager know that, hey, Phil [Barnes] and Greg [Brasel] got together and they identified this problem and they fixed it, just to let you know. And we both let Jack know.

Swent: You didn't have to go up and back down.

Krauss: We didn't have to go up and back down. When I went up to Lead [Homestake Mine], I was just blown away. In order to deal with even a trivial matter between departments, the only way that it could be resolved was for the environmental engineer to tell the environmental manager, and the environmental manager to tell the metallurgical manager, and the metallurgical manager to tell Al Winters [the manager], and Al Winters then would tell the engineering department, and the engineering department would tell the operations department, and by the time they got down there, it was too late, and nobody cared. It's kind of like the telephone tree. The message that started out was very different from the message that ended up.

But I think that was perhaps not unique, but it was certainly central to what I have characterized as the McLaughlin culture. There was this sense of teamwork and a sense of mutual respect at all levels. Certainly there were conflicts over the years. I mean, initially there were terrible conflicts between the mine manager and the mill manager over everything, but primarily metallurgical balance. The mine always insisted that it was sending more gold up the pipeline than the mill acknowledged as receiving, and those were bitter, bitter battles.

But largely, on balance, over the years it was a very supportive team working together in achieving a mutual accomplishment and a lot of respect. People would [say], "Boy, you've got that question? Go talk to Royce Smith. He'll help you. He really knows what he's talking about" kind of attitude. Royce Smith was one of the metallurgical guys. Or, "Go talk to John Turney."

I don't think that's always true in organizations. I know when I worked in Sonoma County there was a lot of backstabbing. There was a lot of criticism of people's not--so and so, well, he's a turkey; he doesn't do his share, you know, kind of attitude. And I really never heard that in the context of the McLaughlin group when Jack was there and beyond.

Swent: A new young organization. Maybe it's easier?

Krauss: I think it probably was new, different. Heavens, the Homestake Mine organizational structure evolved over 130 years or whatever, and that's the way it was done traditionally. And we had visitors from South Africa, where they had twenty or thirty layers in the organizational chart between the man with the shovel and the general manager. At McLaughlin there were maybe four or five. It certainly is a much flatter organization and much more supportive and much more effective.

Jack was certainly instrumental in promoting the role of environmental compliance in the operations. He and I agreed very early that the environmental management could not occur as a matter of one department policing the others. There couldn't be a cops-and-robbers type of thing where the responsibility for environmental compliance was exclusively that of the environmental department. And we worked very hard to identify, within the operating responsibilities of each employee, those things that needed to be done to maintain environmental compliance.

So the foreman that dispatched the trucks also made sure that they maintained their speed limits, and he also made sure that the water trucks were available and on the road when they needed to be, and the maintenance group that maintained the process equipment also maintained the air scrubbers, and the process engineers monitored the effectiveness of the tailings pumpback systems and checked the slurry line for leaks. All of the activities that needed to be performed in order to make sure that everything was operating within the limits of the permits, in compliance with the permits, were activities that were conducted by the operating personnel.

The role of the environmental department was to keep them informed of what those activities needed to be and to monitor and record that compliance and report it to the agency.

Swent: You weren't put in a policing position.

Krauss: No. It was a much more positive relationship, then, between the environmental department and the operating group. What I found was that they loved it. They took great pride in it, particularly as we maintained a high profile with the community and promoted to the public the idea that we were environmentally doing a good job. They took pride in the fact that they were part of that success. That of course reinforced their performance in that role.

Swent: Going back just a bit--maybe this goes back to the management style--but how did being so close to the head office come into the picture?

Krauss: Well, it's always a problem. You've got a lot of meddling from people, the operating vice presidents. Jack was a master at buffering his employees from San Francisco, and he acknowledged that. "My job was to deal with those guys from San Francisco. You do your job, and I'll keep them off your back." I don't know if he would like me saying that, but I do remember him saying that, and he did that very, very well. He kept San Francisco satisfied that we were on track.

Swent: There's an assumption that they wouldn't be supportive?

Krauss: No, I don't think so. There's a tendency for upper management to sometimes become micromanagers, to enter into the detail of an operation. I don't pretend to know what their full responsibilities were, but certainly their attention was divided among a lot of projects, and if they didn't have a lot of other projects and McLaughlin was close by, then that was an easy one to pay attention to. So sometimes they got involved in micromanaging things.

There are a couple of ones that I can remember. I remember when we built our expansion, when we doubled the throughput and put in the parallel grinding circuit, somebody from San Francisco --I think it was Rex Guinivere--had noted that one of our competitors had had success at buying and using used equipment, and thought it was a good idea that we look into saving money by buying used equipment, which was kind of interpreted as a directive to go out and find a used mill and install it and tell everybody how much money we saved, which we did.

But it turned out to be a unique piece of equipment that was different from anything else we had on site, that complicated the maintenance. And rather than being a twin of the equipment that we had on site, that could share spare parts and be maintained in the same manner, there would have been a lot of efficiencies in twinning the facility we had, and that was the original proposal. I suppose there was an initial capital savings of maybe several tens of thousands of dollars, maybe even a couple of hundred thousand dollars--I don't know what the numbers were--but whatever savings were achieved in that initial capital expenditure was more than eaten up in the additional maintenance costs and lost production that followed.

I mean, that's just a kind of example that micromanagement can get in the way. It's not unique to Homestake or to mining; it happens in all organizations. But Jack as a manager I think was excellent at recognizing that and buffering that and not committing that same mistake in the supervision of his reports. Certainly I always appreciated that, and I know the other people did. I've talked to others about it.

Swent: And he apparently did a wonderful job in the community also.

Krauss: Oh, there's no doubt of that. He became a prominent member, recognized member, I guess is the better adjective, of the community and active in Rotary and Chamber [of Commerce]. And he did that just of his own natural instincts. It was not something that I think he did in a manipulative sense; it was just, you know, this is the way we are in the community.

Swent: He enjoyed it.

Krauss: Yes, and was well respected and contributed a lot to the community in the years that he lived there.

Phil Barnes Compiles the Monitoring Manual

Krauss: One other person who put a lot of work and effort into organizing and managing the environmental programs was Phil Barnes. Phil came from Pitch [Colorado], where he had been the environmental manger there and involved, along with others, in the permitting, licensing of the Pitch uranium mill, which I think we talked about in my interview several years ago. It was a contentious permitting effort that resulted in litigation and ultimately a mediated settlement, followed by a decision by the board of directors to not exercise the permits, which had to be disappointing to the people that had put all of that effort forth.

I had met Phil when I first joined the company, when I toured our Colorado offices and talked to him then. He had expressed interest in working at McLaughlin, and when the opportunity came up to employ him, I jumped on it. He turned out to be really the hardest working, best environmental engineer I've ever known. He was absolutely steadfast, meticulous, thorough in everything that he did. He was able to go through all of our environmental monitoring requirements from the multitude of permits, and compile them all into one document called the monitoring manual that organized all of our water quality monitoring requirements and the methods and the frequencies and the parameters and the requirements--all of our air quality monitoring requirements, all of our engineering monitoring, seismic monitoring. Really managing the program would have been very difficult had he not undertaken and succeeded at that task.

It has allowed us to compile kind of a procedural manual. If you do all of the things in this book, then you're in compliance without having to go back to each of the individual permits and determine whether or not you're in compliance, and we then circulated that monitoring manual to all of the regulatory agencies and said, "This is what we believe you have required us to do. Take a look at it and tell us if we're wrong, because this is what we're going to do."

We persuaded them to sign off on our monitoring manual and to agree that it superseded the permits, and then, as modifications to the permits occurred over the years, we didn't have to go back and rewrite all the permits; we just changed the permits to say, You will do the monitoring as reflected in the approved monitoring manual, and then we could adjust the monitoring manual periodically.

Over the years, we reduced the monitoring dramatically. We started out water quality monitoring for groundwater and surface water monthly, and then after two years we reduced that to quarterly, and after six years or eight years we reduced it to semiannually, which saved a lot of money in terms of the monitoring costs but also reflects the level of confidence that we were able to develop within the regulatory community because we had been willing to develop a data set based on the frequency that was employed initially.

We could have argued initially: you really don't need to monitor this stuff monthly. If the tailings pond is going to affect downstream water quality, it's going to be a very gradual process over many years; it's not something you're going to detect from March to April. But rather than doing that, we said, "Okay, you want it monthly, we'll do it monthly. Now you can see that it's unchanging over this period of time. Doesn't it make sense that we reduce the frequency?"

And ultimately it was a great benefit to us because we had enough data to provide an adequate statistical sample when we did our comparisons. Without having an adequate sample, you can't run the statistical analysis. You need to make the demonstrations of compliance. So it gave us a success in that regard.

Swent: And that continues.

Krauss: We told the community when we permitted the mine that we would be willing to continue post-closure monitoring for up to fifty years. But that's very similar to saying, "Yeah, we're happy to monitor monthly." I think that the demonstration of compliance over twenty years will enable Homestake to persuade the agencies to reduce that period substantially, particularly in light of the fact that other kinds of monitoring is going to be conducted under the auspices of the research conducted by the university as they occupy the site, so you don't really need to do the water quality chemical analysis on the same frequency at the same number of locations that we've done previously if Peter Connors is going to monitor the aquatic ecology.

Maybe if he sees some dramatic change in the populations of benthic organisms, then you go back and increase the amount of water quality monitoring to see if there was a chemical factor that caused that change, but I think the agencies are pretty willing to be rational about that, so long as you can provide them with an adequate scientific justification, and that's what we were able to do over the years.

Phil also organized the compliance documentation. Not only do we have to conduct all this monitoring, but somehow we had to collect all of the results and compile them and report them to the agencies. He was really responsible for developing what we call our annual environmental monitoring report, our annual environmental report, which, rather than sending a compliance report to each individual agency that contained just the information that they required in their permits, we compiled all of the monitoring results into a single report and sent everybody a copy of that report, and then they could select out of that the data that were relevant to their jurisdiction.

Swent: Is that the same as that beautiful full-color report that you handed out at the annual meeting?

Krauss: No, that's fluff. [laughs] This is data. This is data. This is the three-volume set that includes all of the chemical data from the analytical labs; all of the quality assurance data; all of the independently conducted engineering, geotechnical surveys and reviews; all of the aquatic ecology studies and the underlying data. It's the scientific information on the basis of which you can conclude what, if any, changes have occurred in the environment over the course of the last year.

Swent: And that entire thing goes to everybody?

Krauss: It goes to each of the agencies from whom we receive permits. The mailing list now is about fifty, I think, or forty. They joke about it because it's such a huge--it's three volumes; it's a total of maybe eight or ten inches of paper and printed two sides. And some of the agencies kind of rankle about it, you know. Bob Reynolds, the air pollution control officer in Lake County, said, "Just send me the stuff in Lake County. I don't want all this other stuff." And we joked about it, and he said, "Well, at least you could put the BTU rating on the cover page," and I said, "What do you mean?" He said, "When I throw it in the fireplace, I'd like to know how much heat I'll get out of it." [laughter]

Dean Enderlin, who is now performing that task, for the first time this year, is issuing a report on a CD, so he's actually compiling all that stuff and issuing it digitally and sending everybody a little disk[1]. We'll see how they receive that. But it will give them the ability to review those portions that are relevant, and not fill up their bookcases.

It is kind of funny. You go into Napa planning department or Lake planning department or the regional water board, and somewhere in there they have a bookcase that is nothing but Homestake monitoring reports over the twenty years. Nobody quite wants to throw them away, and nobody quite wants to read them, but it did meet the requirement and it has done it in an effective way.

Phil's work was complemented by that of a guy by the name of John Lawton, who was a local Lake County air quality engineer who designed and installed the initial air quality monitoring network and meteorological monitoring network. This was very, very early in the development of computers and telemetry for environmental data. And John was very excited about the availability of new technology and developed a system that we still use today that was state-of-the-art then and is quite common now, which is a data logger at each site that would collect the weather data and then transmit it by phone line back to the environmental office, where it could be downloaded and summarized.

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[1] "McLaughlin Mine Annual Monitoring Report July 1, 2000-June 30, 2001, Includes Closure Plan & Update to Environmental Monitoring Manual" is in The Bancroft Library supplement to the oral history.

And then we did the particulate monitoring samples, and he directed the source monitoring on the autoclave stacks and the refinery and carbon-regen kilns and other elements of the process plant.

His work and Phil's work was later taken over by Dolora Koontz and Jim Jackson. Jim did the air quality. He's now with Southern Peru Copper, and Dolora is now back in Colorado. I'm not sure who she's working with, but both of them were, again, as was Phil, very meticulous and expert at fulfilling their responsibilities. Dolora also brought to the project a real interest in the wildlife monitoring and the wildlife programs and the bat protection efforts, so that was an exciting addition to our program.

Swent: Yesterday I mentioned having heard on the radio that somebody was conducting snake sensitivity training with construction workers, and you mentioned that you had to do bat sensitivity training.

Krauss: It really wasn't a lot of sensitivity training. I think the snakes is the hardest one, and Dolora took that task on. Actually, it got to the point when somebody came across a rattlesnake, instead of stompin' on it they called Dolora and she would come by and stick it in a bag and relocate it. People would kind of joke about it, but on the other hand I don't think they really minded it.

Those crews really did and do to this day appreciate the environment. I remember Ivan Markland early on had an accident in which he was coming to work at some godawful hour in the morning, 4:30 or 5:00 and driving up Morgan Valley Road, and a mother mountain lion and two cubs--two yearlings, not really cubs, and practically full grown--ran across in front of his truck. The mother made it across, and the first cub made it across, and the second one smashed into his windshield and was killed.

So he brought it out to the site, and we called Fish and Game and reported it. But he was brokenhearted. Here's a guy who I'm sure is a hunter and fisherman and sportsman, but he was brokenhearted that this critter had smashed into the front of his truck.

When we discovered the bat population in the workings and began efforts to figure out how to relocate them, a lot of people volunteered time, people from the geology department and the environmental department, and when we started fabricating a gate to protect their new habitat, the maintenance crews got involved and excited about helping on that.

For a while we had a program with the bird rescue center to release recovered raptors on the site, and we had a hack box up on top of the hill. There were half a dozen employees that would--you had to feed these raptors in the hack box for--I don't know--two weeks or a month or something before you released them. It was kind of cute. The bird rescue center supplied us with frozen chicks, baby chicks, as food, and the folks working on the program thought, Well, that's a pretty boring diet, so they started picking up roadkill on the way to work in the morning, and they would stop by Marion's [Onstad] house and chop it up into pieces and provide it as food for these raptors.

There really was a spirit of participation and environmental awareness from everybody that I worked with in the program over twenty years.

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Swent: It's a little harder to lug a live raptor than it is a dead lion cub, too.

Krauss: And even harder to lug a rattlesnake, but everybody seemed to come around.

A Good Track Record Facilitates New Permits, Reporting

Krauss: It was kind of interesting. Just as startup was completed and we had begun to regularize all of these monitoring and monitoring reporting documentation programs, it's kind of like seeing the light at the end of the tunnel. Just like everyone else, the hours had been long, a lot of weekends, a lot of twelve- and fourteen-hour days for a long time, thinking, "Well, now that things are going to get regularized"--and then Jack came along and said, "Well, now it's time to double the throughput of this plant, and we're going to have to do a whole new round of permitting."

And so again we were in the process of working with Davy-McKee in designing, completing the engineering that we needed to describe the new project, the expanded project and its consequences. I think that was the time at which we permitted the recycle water, which allowed for the transport of water from the tailings pond containing traces of cyanide outside of the tailings pond mill complex for the first time.

But there were sufficient tons of non-refractory ore to justify the development of a parallel circuit and double the throughput of the plant. And it was really quite interesting. I think this was probably '88 that we permitted that. It wasn't very long after startup anyway, and when we went through the permitting process we were so favorably received in the counties that, as I recall, there was no opposition in any of the three counties to the permits that allowed us to double the throughput on that plant.

And that, of course, then provided the basis for future adjustments in the process plant that allowed us to include what had originally been classified as waste rock, as ore. The low-grade materials that might otherwise have been waste rock were able to be processed through this oxide circuit as it was modified over the years.

And I think it was about this time that Jack moved on to--I don't know whether he went directly to San Francisco and then to Canada--I suspect so, and Ron Parker became his successor as general manager. Ron really--everybody used to joke--Ron kind of rode the roller coaster at the top of the hill. He was general manager during the period when McLaughlin production was at its peak, and we had the highest-grade ore available to feed the mill. Actually, the price was probably not what we had hoped, but it wasn't terribly depressed during his tenure as manager, either. But he kind of pulled the watch that had all of the ingredients of success.

It was during that period that we added a flotation plant, another round of permitting.

Swent: There are a couple of things here that--this again is from the *Napa Valley Register*--there was a problem with a “toxic” spill that turned out to be lime?

Krauss: There were a couple of transportation accidents over the course of the operation. Trucks spilled materials along Morgan Valley Road. It was kind of interesting because technically, legally the material was the responsibility of the trucking firm until it was delivered to the mine, but we took the attitude that, because the public would perceive it as materials belonging to Homestake, that we would respond.

And it seems to me during the years of operation there were --I think there may have been three incidents. There was one of ammonium nitrate, which is the fertilizer used as a blasting agent. And there was one of lime, and there may have been one of magnesium chloride. The lime was inconsequential. You just sweep it up and you're done. Unfortunately, I think the ammonium nitrate--I think the truck driver actually perished in that accident; he was speeding along the road and missed a curve and tipped over.

Swent: But it wasn't the ammonium nitrate that killed him.

Krauss: No, it was the accident. But over the years we were meticulous in making sure that as soon as anything of that sort happened, that we notified everybody, starting with the Solano Irrigation District, and Fish and Game, and water board, and the counties. And all of them had the opportunity to come out and supervise the cleanup and make sure that the resources for which they were responsible were protected, and within a year or two of operation we called them and notified them and told them what our response was, and they would say, "Thanks for letting us know. We're confident that you'll take care of it."

So when incidents occurred that would have brought regulatory responses in other circumstances, in our case, they said, "We trust your track record, and you take care of it, and tell us when it's all over." Which is, again, a demonstration of the continuing confidence in our folks out there.

During Ron's tenure as manager--he came to the site from Missouri, the lead-zinc operation in Missouri, and he came in--I think he was a mechanical engineer, and he came in as maintenance engineer, and then--you would have to ask Jack and others what selection process was used, but he was promoted to the position of production manager as kind of an understudy of the general manager for a period of time, and I think Jack's transfer to San Francisco or Canada came a little quicker than people expected it, and Ron stepped in as manager earlier than he expected to, but he certainly took over and handled the job well.

We always used to joke that anybody that worked in that corner of the office was subject to some sort of a force field because their personality seemed to change when they came from one end of the pecking order to the other.

Initially Ron was very anxious to make sure that he was fully informed about everything that was going on, so in my view, anyway, for the first six or eight weeks of his tenure there, not only did I have to do my job but I had to write him a memo about everything that I did, so my workload went up 30 percent or 50 percent for the first several months. But once he developed the confidence that the people working for him were doing the things that he expected them to do, that requirement went away and I really enjoyed working with Ron over the years that he was there.

An Elegant Metallurgical Process

Krauss: Metallurgically it was really quite an elegant process. The addition of the float plant allowed us to develop a sulfide concentrate that could be added to the autoclave circuit as it was needed to optimize the operation of the pressure oxidation system. The autoclaves functioned best at a steady concentration of sulfide--sulfur--of around 4 percent or 4.2 percent. Prior to the float plant, we had made great efforts to blend ores coming out of the pit to maintain that sulfur level, but it wasn't always possible to do so. To the extent that it fell below that level, we needed to burn propane to supplement the heat production in the process. We may have had to acquire sulfuric acid that would have otherwise been produced from the sulfides in the ore.

But with the addition of the float plant, we were able to create our own sulfide concentrate out of the low-grade ore. A significant portion of the contained gold from the low-grade was contained in the sulfide concentrate, and that portion of the gold then achieved a higher recovery rate by going through the autoclaves, where it was oxidized. We got 90, 95 percent recovery on that portion of the low-grade ore.

And we used the oxide circuit that Jack had built for the oxide ore then to leach the float tail and scavenge the rest of the gold out of that portion of the low-grade ore. So the combination allowed us to increase the recoveries that we would have otherwise been able to achieve on that low-grade ore and to optimize the operation of the autoclaves and reduce the cost of operating the autoclaves by having a constant sulfide-sulfur level.

Ultimately, in retrospect, it also allowed us to stockpile low-grade ores and allow them to undergo natural oxidation under rain and wind and water so that when we finally had exhausted the high-grade ores, the autoclave-grade ores, those that could be economically processed in the autoclaves, the remaining low-grade had oxidized sufficiently so that recoveries had increased from something on the order of 40 percent to something on the order of 60 or 65 percent.

So really, if you look at the sequence of metallurgical solutions applied to that ore body over its life, it's really quite elegant. You start out with the autoclaves, you add the oxide circuit, you convert the oxide circuit to flotation and low-grade processing, and then you end up with the low-grade ores being processed through direct cyanidation, and it really optimized the recovery from that ore body.

Certainly the other achievement of the folks working there, and a tremendous achievement, was the ability to develop these various metallurgical circuits and to operate them at an ever-decreasing cost. The original feasibility projections assumed somewhere between $430-440-an-ounce gold, as I recall, over the operating life of the facility, and it's a price I don't think we achieved at all! It certainly wasn't the average price.

Swent: The price went down dramatically, from something like $800 an ounce at one point.

Krauss: Yes. So really the only way--and certainly I'm led to understand that the mine was a disappointing investment from the point of view of the board and the management because it didn't bring the return on investment that was anticipated, but it's interesting to me that it did in fact still operate at a profit. It did pay for itself. It did create a huge amount of new wealth in the local community and provide jobs for a lot of people and provide the cash flow to the company for a period of years that, to my understanding, financed our acquisition of Corona and the expansion of the company in other regards.

So on the one hand you could say you could have taken that capital and invested it in a savings account or a CD in the Bank of America and made a better return on it, but on the other hand, having invested it in McLaughlin certainly promoted the growth and expansion of the company.

[I think John Turney was largely responsible for the philosophy that drove the processing innovations.[1] John is a very thoughtful person and he was always trying to find that perfect balance between throughput and recovery and cost that optimized gold production. That was not always the case. The first mill manager, Joe Young, was of the old school that measures success solely by throughput. I know that there were periods of time that recovery and production were sacrificed on the singular altar of tons per day.

I'm not sure if John was still involved when we installed the float plant, but Royce Smith and Steve Mitchell and those who followed him certainly learned and absorbed his approach to engineering. Also John was one of those "bigger-picture" people, someone who clearly understood the requirements and constraints and opportunities outside of his area of direct responsibility. I always enjoyed talking with John. I remember that he had a lot of interests beyond his mining work and was always a bit incredulous that so many Homestake people lived strictly for their jobs.

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[1] The four bracketed paragraphs were inserted by Mr. Krauss during his review of the draft transcript.

Before I forget it, I want to mention another person who heavily influenced what I've come to call the "McLaughlin culture," and that was Knollie Sells. Knollie had responsibility for all of the administrative functions, the accounting and the purchasing and the warehousing and was kind of the projects comptroller and financial guru, the kind of person whose contribution is behind the scenes and often overlooked. Knollie was really instrumental in so many ways. He developed very early computer spreadsheets for budgeting that let each of the managers track their costs and find ways of improving them. He also did all of the strategic planning and long-term budget analysis and the evaluation and justification of the capital improvement projects that kept the mine competitive even in the face of what seemed to be an ever-declining gold price.

Knollie was kind of like John, too, in that he had a broader view of events than just his area of responsibility. We used to chat after work and I certainly learned a lot from him. I think he came to McLaughlin from Grants where he started out as a laborer and worked his way up, went back to school, and picked up the skills he needed to move up into accounting and then management. I'll always remember his comment, I think it was at the dinner for Jack when he moved on and we had kind of a roast, and Knollie got up and said something about he was really sorry to see Jack go because now we all had to set about training a new general manager. I always remembered that remark whenever in later years we got a new vice president of operations.]

So, the only reason that McLaughlin did make some money was the ability of the metallurgists and the mine engineers and the geologists to optimize that operation. On the geologists' side, there were some additional reserves discovered through infill drilling and exploration. I think the contained ounces of the deposit increased from the original anticipation of 2.9 million ounces to 3.5 million; I believe those are the numbers. The geology folks can give you those numbers better than I.

The addition of the oxide circuit and the low-grade circuits, the float plant and the low-grade circuits allowed us to convert waste to ore, which dramatically increased the reserves, probably part of that change from 2.9 to 3.5.

Also initially we were anticipating actually processing something on the order of 20 million tons of ore, and I think ultimately we processed closer to 40 million tons of ore. Total tons processed through the plant, through the various modifications of the circuit.

And on the process end, the maintenance folks and the engineering folks and the metallurgical folks were constantly working on cost improvements. We talked a little bit about Ivan and his group and the improvement in availability of equipment and allowing us to maintain throughput through the plant at a higher percentage of time. The metallurgical group was constantly optimizing the process for throughput rate and reagent additions and costs.

As a consequence, even at the lower price, the project still was able to make some return on its investment, in contrast to many other operations permitted around that same time or after that, certainly California operations whose feasibilities were predicated on the same assumptions that McLaughlin's were and who operated for a period of time, and all of which lost money, so far as I know--the Coliseum and Sonora Gold and Hayden Hill. The list goes on and on.

All of them came around the same time, most of them slightly after McLaughlin, but all of them were money losers so far as I know. I don't know if Homestake and its crews would have made them money winners or not, but certainly McLaughlin was an exciting example of the competence and effectiveness of those folks in perfecting and optimizing that deposit.

Preventing 283,000 Years of Acid Generation Liability

Krauss: One of the bumps along the road that we encountered was the development of acid drainage in our waste dumps that was in excess of what was originally anticipated in our permitting studies. Very early in the development of the permits, we had evaluated the acid potential of the waste, based on what was then state-of-the-art technology, which involved undertaking what were called acid-base balance studies, what we would now call static testing of waste materials, that involved collecting what were thought to be representative samples of the waste material and testing it for its total acid potential and its total neutralizing potential and comparing the two and determining whether or not there was a sufficient excess of alkalinity over acidity to account for neutralization of any acid that might be produced.

Those studies suggested that we had a very small portion--I think something on the order of 7 or 10 or 12 percent--of the total mass of waste rock that had an excess of acidity over alkalinity, and as a consequence it was planned that the waste could be simply randomly commingled and dumped. To the extent that acid was formed, it would be neutralized by the carbonates and there would be no problem.

Early monitoring suggested otherwise. One of the--I guess there's a little aside. One of the differences between McLaughlin and other mines prior to that date was the placement of monitoring stations internal to the waste units. We were monitoring the under-drains that were constructed beneath the waste dump, even though that water was not being discharged from the site. We considered that to be kind of an early-warning system that would allow us to measure the reactivity of that waste as it weathered in place.

And we saw very quickly, we had an upward trend in sulfate and a slight downward trend in pH, and if you projected that forward, we would have very quickly been developing leachate flows that were not dischargeable. So as a result of that, we went back and revisited the acid-leachate issue, acid drain issue.

Swent: This is all contained?

Krauss: It was all contained, sure. There was no release of it from the site. We did in fact have in place ponds that had originally been intended as sediment containment ponds that were available then to contain the leachate and prevent its release to the downstream watershed. We talked earlier about the frustration the engineers had in wanting cut-and-dried formulae for storm water containment and protection.

Those sediment ponds were installed at Homestake's option. We weren't required to put them in place. There was no law that said that we had to contain and settle storm water before releasing it to the downstream watershed, but it was our belief, as we evaluated the possibilities, that we would not meet a zero degradation standard in the watershed of Lake Berryessa unless we had some ability to contain and monitor and settle those waters.

So we installed more than we were required to. Having done so, it was interesting that three years later the EPA and the water board established storm water regulations that would have required us to come back and build those ponds after the fact, had we not anticipated and constructed them.

Furthermore, having had them in place, they were available for containing the acid leachate that we would have otherwise been dumping down the creek, so there's a lot of benefit to that additional level of conservatism that went into the environmental design of the waste dumps.

Swent: I don't understand if they were contained why it mattered whether they were acid. Why did you care?

Krauss: You've got to do something with that acid. Are you going to run a treatment plant for the rest of the world, for the rest of eternity? You contain what's produced, but it continues to be produced, and it's got to be disposed of in some manner. And so what you really want to do is prevent or minimize, to the extent that you can, the production of acidic waters that have to either be contained on site and evaporated, or treated in order to be discharged at a huge expense. Because we were able to contain it initially, it prevented us from going out of compliance, while we were able to come up with a scheme for preventing the formation of acid in the future that could have certainly closed down the operation.

There had actually been a panic, I think, in the troops at that point. I know I worked closely with Dave Crouch. I turned to him immediately for support and advice and worked with Jack, and it was kind of an O-Lord-what-are-we-going-to-do time. At the time, Dave had been working with a Denver firm, SRK--I think it's Steffen Robertson & Kirsten--in preparing a report for the American Mining Congress on acid drainage.

So he said, Here, this is a firm that has some expertise on predicting and managing acid drainage, and I've been working with them. Why don't we hire them to take a look at the studies that we've done and the problems that we're having, and to provide us with a prescription for solving this problem? So we did work with them. We did some additional column testing.

It was very quickly evident, both through the work we did with them and other people later, that the problem with our prediction was that the waste material behaves very differently in the field than it does in the lab, and if we were to take 200 million tons or 130 million tons of waste rock and grind it all up to minus-200 mesh and mix it all up so it was uniformly commingled, which was in effect what we did in the lab test, that it would have behaved as predicted in the lab test.

But in fact we were drilling and blasting and shooting material, which tends to cleave along the veins, which exposes the sulfides to weathering. Most of the neutralizing material, the carbonates, is locked up in the mass of the blocks of material, and it's only the surface of those pieces of waste rock that are really available to react with any acid that is formed.

Additionally, the kinetics of the reactions were very, very different. The acid formation reactions, particularly of some of the sulfides in the deposit, were very, very rapid, whereas the neutralizing reactions were very, very slow. So as a consequence of these field characteristics, the behavior of the material in reality was very different from that predicted by the lab tests.

In fact, we concluded that more than 40 percent of the rock would be net acid producing, as compared to the original projection of something like 7 percent. Working with SRK, we produced a plan for managing, for preventing, or at least minimizing the production of acid leachate that involved testing the material as it was mined and classifying it and segregating the acid-producing from the non-acid-producing, and encapsulating the a-r-d [acid rock drainage] material and the non-a-r-d material.

And we kind of presented this plan to the mine engineering group and said, "Here, you've got to do this," which was a terrible failure because they looked at it and they said, "Well, this isn't practical and it can't be done, and besides that, we're not gonna do it." I said, "Well, if we don't do it, we don't have a project, and we're going to have to do it." We kind of hit an impasse.

Swent: Who were you talking to?

Krauss: These would have been the mine engineering group primarily. I think Tim Janke at the time was chief mine engineer. So I kind of regrouped and thought it through and said--

Swent: This meant just physically moving stuff to a different location?

Krauss: Well, it meant identifying and classifying material in the mine before it was mined, distinguishing between that that was acid-producing and that that was not acid-producing.

Swent: Versus high-grade versus low-grade?

Krauss: Well, they were already classifying ore, yes. Really we were doing very complicated ore control, and the idea of doing waste control in the same manner that we did ore control was kind of overwhelming to the folks when it was first proposed. And also SRK's report was very dense, and their proposed testing procedures to distinguish between acid-generating materials and non-acid-generating materials was very complex and involved laboratory analysis that would have greatly slowed down production.

It was a mistake on my part in that I had some technical geochemists prepare a report that really prescribed operating restrictions, where they had no experience in operating responsibility. They were perfectly right in what had to be done, but they were well off base on how to do it. When I recognized that fact, I said, Well, it's kind of back to the drawing board. I'm going to have to deal with this in a different manner.

I had the good fortune of meeting a geochemist in Sydney [Australia] a few years prior to that when I gave a paper in Darwin, by the name of Stewart Miller. He had worked with a number of operating mines to identify and develop procedures for minimizing acid production. I had been very impressed with his ability to meld his geochemical knowledge with the mine engineering and operating constraints that were inherent to any mining project.

So I believe it was Jack at the time--I think this was before Ron took over--authorized me to hire Stewart, and he happened to be in the U.S. on another project anyway, so we didn't have to pay him a lot of transportation time. We sat down with him, and we went through the same exercise. He reviewed all the work that SRK had done. We did two things differently this time.

One was he worked with our geologists to develop a means of distinguishing acid-generating from non-acid-generating rock that would not require sending samples to the lab and making lab analyses. He originally proposed a field test. He called it the "fizz test," where representative materials would be tested by exposing them to peroxide and measuring their rate of reaction. It soon became very evident to him, and in working particularly with Dean Enderlin and Norm Lehrman and the other geologists that the acid potential of the material could be ascertained by visual observation, that you could actually see the pyrites and the sulfides in the drill cuttings from the blast holes, with enough reliability to distinguish acid-generating material from non-acid-generating material.

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Krauss: Once they discovered they didn't need to employ the field test, not only did they not need the lab test, they didn't need the field test, but they could make visual identification, then we could remove the obstacle of slowing down production while we were waiting for lab data that distinguished acid-generating from non-acid-generating material.

The guys ultimately in their solution agreed that they would hire one additional geologist whose job was to survey the drill patterns and to map, based on his visual observation, those areas that contained sulfide material versus those that were sulfidic material. And then the ore control plotting, based on the assay of the blast holes, was plotted on top of that, and when the ore blocks were marked, the waste blocks were distinguished, too.

So we had in addition to the four or five or more categories of ore types, we had at least two different waste types, and they were separately flagged in the pit and separately mined in the pit. It enabled us to place them in the waste dumps in a manner that allowed the encapsulation of the sulfidic material in low-permeability, non-sulfidic clays.

The other thing we did, rather than providing the mine engineering group with a prescription of how they had to build their waste dumps, Stewart worked with the mine engineering group to develop, really, criteria that needed to be applied to the planning of the waste dumps, so we came up with an example of the criteria that we needed on the outer surfaces of the dump, a minimum of twenty feet to daylight between any acid-generating wastes and the surface of the dump. And we came up with the criteria that we needed at least every fifty feet vertically in the dump, impermeable clay barriers to prevent air movement and water movement that would promote oxidation and acid formation.

Once these criteria were developed with the engineers, then the engineers could simply input these criteria into their normal dump-planning procedures, and rather than implementing somebody else's prescription, it became their prescription, and rather than being impossible to implement, it became routine. So by the end of six months, we had in place I think an innovative and novel acid-prevention process that started with the in-pit identification and classification of the material and proceeded to the selected placement of that material at various headings within the waste dump that resulted in full encapsulation of the acid-generating material with low-permeability clays.

We were very fortunate that in the waste inventory we had ample clays to accomplish that encapsulation. The combination of serpentine and mudstone materials included a whole lot of very low-permeability material that we could place on the surface of the dumps and create, in effect, a water and air barrier. These were not engineered, compacted barriers; they were simply segregated material, selectively placed material with low-permeability materials surrounding the acid-generating materials, and then the outermost skin of the dump is a higher permeability waste rock, oxide waste rock, and topsoil that absorbs and diverts the bulk of the infiltration of rainwater away from the clays and prevents penetration into the dumps.

The result has been real successful. The volume of leachate formed in the dumps currently after they've been closed now for four or five years is very, very minimal and certainly manageable. We are currently planning to contain and evaporate it on the site.

Swent: And you are revegetating as well, aren't you?

Krauss: Oh, yes. And the vegetation. One of Stewart's points early on was that a vigorous vegetative cover is an important component of preventing migration of oxygen into the dumps, that the vegetation itself and the roots of the vegetation consume the oxygen that might otherwise be available to oxidize the sulfide.

It was really quite gratifying. I think at one point Tim Jahnke--and I really admire Tim; he's one of the few people that I've known that was really open-minded enough to change his view on something and admit to it. Most people dig in their heels, but when he initially said, "This won't work," within six months he wrote a paper and presented it to the Colorado Mining Association about how the people at McLaughlin had identified and solved an acid-generation problem.

As a result of that paper, he received quite a number of visits from other mining companies who were encountering that same problem and wanted to understand the McLaughlin solution. I can remember how gratified I felt one day, sitting in the conference room in the mine offices, listening to him make a presentation to a group of Newmont mining engineers and geologists on how McLaughlin had solved the acid-generating problem.

It was an important lesson to me. It's something I should have known all along. I think just simply because I kind of panicked because the consequences of not solving this problem were so dire. Here we had promised the world that we were going to have a pollution-free mine, and the next thing I knew, we were looking at the possibility of hundreds of thousands of years of acid production running down the creek into Lake Berryessa.

It was literally that. At one point, Jack said, "Maybe one solution to this would be to--what if we enhance the rate of oxidation and capture all the leachate and process it. Can we wash all the sulfides out of this massive waste rock and eliminate the problem that way?"

I said, "Okay, we'll go back and do a calculation of that." We made a calculation on that and, with the water available from natural rainfall, it would have taken 283,000 years to flush all the acid out of that material! That kind of puts it into perspective. Without having come up with some solution, we were truly looking at a legal and technical violation of our permits that would have been a disaster for the project and a huge liability to the company.

But it was solved as a matter of teamwork. Once the rest of the team got engaged and acknowledged the problem and put their best efforts to resolving it, it came out very, very favorably. I really think that that teamwork at McLaughlin distinguished

McLaughlin. We talked a little bit about that earlier, the horizontal communication and flat organizational structure, but I think that kind of teamwork really was a different culture than was traditionally found at most mining operations.

Integrating Environmental and Production Activities

Swent: Everybody always talks about teamwork.

Krauss: But it doesn't always occur, yes. And teamwork certainly doesn't occur if you have to ask your boss to tell your counterpart in the other department your point of view, you know? By the time it goes up and down the chain of command, it's useless.

And it was really exciting to me that we were successful in integrating these environmental issues into the production activities. I know in later years, when our corporate group developed auditing procedures, they tended to focus on the documentation: what paperwork can you show me that will prove that you people know how to stay in compliance? And I said, "Well, we go out and talk to the people. Don't look for the paperwork. Find out from the people." But corporate would say, "No, that's not enough."

But they did. They went out and they talked to the people, and they were absolutely flabbergasted that they had talked to the foreman of a mine shift or an operator in the process plant, and quizzed them on the environmental compliance requirements, and they knew what they were and they knew what their responsibilities were, and they fulfilled them. That, I believe, was a successful change in mining culture.

Swent: Has it been copied by other people?

Krauss: I think progressively so. I think there's an awareness in a lot of operations that you really can't create a distinction between what are environmental requirements and what are operating requirements. That's revealed when you start asking people, "What are your environmental costs?" That's what a lot of people want to know, well, how much do you spend on environmental stuff? Well, when you don't distinguish your environmental "stuff" from your production "stuff," it's hard to tell them. The people that can tell you right off the top of their heads probably haven't accomplished that yet, and the people that have difficulty reporting that--

I could never answer those questions. Most of our environmental management of the mine was budgeted as mining costs.

Swent: Integrated right in.

Krauss: Yes, the acid prevention, the capping, the topsoiling. All of those were mining costs associated with the placement and disposal of the waste rock. Dave Hyatt and I once sat down and wanted to know what is the additional cost of acid prevention work? When we finally looked at it, the additional cost was one additional geologist to do the waste classification. All the material still had to be mined and moved, so the selective placement didn't cost us anything more. We were able to maintain enough open headings in the waste dump so there was always someplace to put everything. Nothing had to be double-handled.

In effect, what we had was, in addition to the one extra geologist, one extra dozer push to push the clay over the top of the sulfide material. Ultimately we calculated that the cost of acid prevention, of implementing the acid-prevention program, was about two cents per ton of waste placed in the waste dump, out of a total mining cost of--well, it varied over the years from somewhere between sixty cents a ton and a dollar a ton.

So a 2 or 3 percent increase in the cost of mining.

Swent: Two or three *cents?*

Krauss: Yes. Well, percentage. It's a dollar a ton, and you're spending two cents a ton, it's 2 percent. It's a pretty insignificant cost to avoid the cost of running a water treatment plant for perpetuity.

Swent: For 283,000 years! [laughs]

Krauss: Right, exactly.

Swent: Did any of these other people like Newmont that came to visit, inquired about it, were they influenced by it?

Krauss: I don't really know. I presume so. I think that a lot of those issues in Nevada are much more slow to develop because they have much less rainfall, and a lot of the solutions will be different because to the extent that they do have rainfall, they can absorb and evaporate it from a cap without having to do the level of encapsulation we did. We're at a disadvantage in this climate because we've got, on average, twenty-six inches of rain a year, and in extraordinary years, fifty or sixty inches of rain. So we had to deal with it in a way a little bit differently than you might in the desert.

Swent: There's no way of quantifying it, but were they philosophically influenced, do you think?

Krauss: You would have to ask them.

Swent: Let's hope so.

Krauss: But I think the other thing that we did, I would like to think as part of the McLaughlin culture, was to be willing to be open to the public, to be transparent, really, to be in a fishbowl--all of our activities, all of our monitoring. Anybody that had any questions, "Come on out and look." "Can I take pictures?" "Sure." Other than getting into the refinery and handling the gold, there was nothing really that we wouldn't share with people. And Jack was more than generous in letting VIPs view the gold pour.

Part and parcel of that was this proactive relationship with adversaries. When somebody said something critical about us and we found out about it, be it private conversation or in the press, our approach was to immediately contact them and invite them to come and meet with us and see the site and explain to us what their concerns were and, if we had a real problem, we told them, "If we're really causing that problem, we want to solve it, we want to understand what you think is going wrong so we can repair it, if that's the case. And if it's not the case, we don't want you to be uncomfortable thinking that it is, so come on out and let's talk."

It's respecting people's concerns and taking them at face value and acknowledging their legitimacy and ultimately dealing with it. So many of the people that might otherwise have been our adversaries over the years were really ultimately quite favorable, even to the extent of--I've worked over the years with the Mineral Policy Center, whose whole goal in life is to close up all mining, I guess you can say. They deny that, but it would certainly seem that way.

Swent: They're in Washington, aren't they?

Krauss: They're based in Washington, but they have what they call circuit riders that are active throughout the West. And Phil Hocker, who was the founder of that group, and I met many times in Washington, and he was at the McLaughlin site on a number of occasions, and he was willing to acknowledge that we were in fact successful in meeting what he thought were appropriate environmental protections.

Swent: He always points out, though, that this is the exception.

Krauss: Well, they like to do that. One of my battles over the years was to say, "No, it's not an exception. The only difference is that we've been more willing to publicize what we've done. We've taken a higher profile." And certainly that's another component of the McLaughlin culture, the willingness to expose ourselves to scrutiny, to take a high profile. One of the reasons that happened was just the location. We were close enough to San Francisco so that when there were tours of congressional staffers or there was press interest in mining associated with the broader issues related to mining, McLaughlin was a convenient place to bring people.

Swent: It's not all that easy to get out to the mine.

Krauss: Well, it's certainly easier than Elko [Nevada], when you get right down to it. And it's a lot more pleasurable to end up your trip in San Francisco and then fly back to Washington than it is to end up in wherever. And we got, as a result of this profile, a lot of attention nationally and internationally, I think initially because of the application of pressure oxidation. There was a lot of interest in the innovative technology. Later, as our environmental performance became more evident, we had quite a lot of attention to the environmental success of the project.

I always remember one--a crystallizing moment in my relationship with the media and the public. It's when Ron Parker and I were working with CNN. They had come out and wanted to take some footage of the mine and interview Ron and myself. I think it was probably in conjunction with a story relating to pressure to reform the 1872 Mining Law.

We showed them around. We had a wonderful day. We had deer running across the waste dumps and eagles soaring, and it was just lovely weather. The stream was full of ducks. They got lovely footage, and everything went great. And then they wanted to do what they called their stand-ups. They wanted to interview us, so they stood me up in front of the tailings pond or something, and they started asking questions. "Well, tell me about this." And I would respond to them, and then they would turn off the camera and they would say, "No, that's too complicated an answer. We need a simpler answer."

"All right, I'll simplify it." So we would do it again.

"No, can't you do it in fewer words and fewer syllables in the words?" And "What is it that the industry is really demonstrating here?"

Finally I boiled it down to two words. I said, "Our mining is environmentally successful because we do containment and reclamation." I have thought about that over the years, and I think those really are the criteria by which you can judge the environmental success of a mining project. If you can contain to your own site all of the potential water quality impacts and air quality impacts, and if you can reclaim those disturbances in a way that's aesthetically acceptable to the public, then those things that the public has identified as being unacceptable consequences of mining have been resolved.

We may have talked about it earlier; I've been involved in some of the public relations efforts where surveys had been made of the public to ask them their opinion of mining. They would just randomly select people on the street and ask them, "When you think about mining, what comes to mind?", and they would say, "Well, mining. Well, that pollutes water and leaves scars." And particularly in the Midwest they talk about "kills miners." They talk about the safety issue. But the "pollute water and leave scars" is directly responded to by the fact that we contain pollution on our own site and we reclaim our disturbances, and that's why our mining is environmentally successful.

So CNN forced me to boil it down into two words.

Swent: What did Parker say to CNN?

Krauss: I don't recall now, but he and I both compared notes on it, and very much we had the same conversation with the reporter, that we were dedicated to--that minerals are essential to society and we believe that they can be produced in an environmentally acceptable way and that McLaughlin was a demonstration of that.

They went home happy. I don't remember what actually showed up on the air, but I think the importance to me was that it really helped me to crystallize my thoughts on what was relevant to communicate to the public about mining and the environment, and that was containment and reclamation. And I've used that again and again since then. It's been a useful communications tool.

And in fact the ongoing monitoring has demonstrated the success of the containment measures at McLaughlin. The downstream aquatic ecology monitoring that has gone on now for twenty years, or going on twenty years. And Peter Connors and his group from UC Davis are entirely satisfied that there's no change in the ecological conditions downstream of the mine as a result of the mining activity.

Since working on McLaughlin, or over the years since joining Homestake, I've had the opportunity to look at a lot of other tailings facilities around the world, and I've never seen one that is as tight and tidy as McLaughlin. I think it's important to acknowledge that a lot of that is serendipity. The fact that we have a favorable local geology that is underlain by very, very impermeable materials is certainly an important component of that success.

The other component of that success was the willingness of the company to investigate the availability of multiple sites and to select an optimal site and to design and operate a facility that required pumping and transporting the ore five miles in order to take advantage of that site. But the serendipity of favorable geology was certainly an important component of that success.

Cleaning Up Three Abandoned Mercury Mines

Krauss: There were some ancillary activities along the way that also related to the community and Homestake's proactive environmental policy. There were a number of abandoned mercury mines in the region. Of course, the Manhattan Mine was the mine located at the site of the McLaughlin ore body, and we were able to essentially remediate that simply by mining it all and processing it. But we did also agree that we would process the calcines, the mercury mine wastes, the processing wastes from the mercury mine so that they would end up contained in the tailings pond. So all of the remnants of that mine have been removed and secured.

We also acquired the Reed Mine. We had the surface rights to the Reed Mine from the Kauffman purchase, which we needed for the freshwater reservoir, but we went back and spent additional money to acquire the mineral rights to give us the right to remediate that mine. That was done, really, as a gesture of good neighborliness to Yolo County. I think it was received in that way. I think there's some press that describes the project.

We removed from the site all the highly contaminated materials. There were waste piles, what they called ash piles, from cleaning of the retort over the years that contained mercury at 80,000 parts per million. It was highly concentrated contaminant. We built diversion ditches around the calcine piles in order to divert any rainwater flows away from those piles and around them, and used the excess spoils from constructing those diversion ditches as cover for the calcines, and reduced their steepness and covered them with dirt and revegetated them and stabilized them in place. It has been a very successful reclamation effort.

We also have put quite a little effort into plugging the old underground workings. The major source of contamination from the Reed Mine was the continuing discharge from the adit.

Swent: Was this high up on the hill?

Krauss: No, it's right down by the creek. There are a number of adits, but the one that was discharging was right adjacent to Davis Creek. The Kauffmans had previously attempted to plug it. They had reduced the flow from probably several hundreds of gallons per minute to a few tens of gallons per minute. The source of the water was, I think, primarily the old geothermal springs that created that deposit. It was kind of ironic. Those springs discharging from natural geology are natural flows, but as soon as those same waters discharged through abandoned mine workings they become mine discharges and are subject to regulation.

But we came in on three different occasions, I believe, and progressively improved the closure by pressure grouting and have in fact interrupted the discharge entirely for a number of years now. It seems to be a successful solution. We're continuing to monitor that. But it's interesting that those waters seem to be one of the more substantial sources of either methyl mercury or mercury readily transformable to methyl mercury. So the environmental benefit of that adit closure was, in my view, important. The community relations benefit was also important.

And in addition we acquired from the Gamble family what we now call the Knoxville Ranch, the Gamble Ranch, which included the old Redington or Knoxville Mine. In the course of that transaction we implemented a cleanup. We actually required the Gambles to undertake a cleanup prior to our taking possession of the site, but we provided the consultants and the direction for the cleanup.

So we cleaned up, really, three historic mercury mines in the district long before mercury became the contaminant de jour that it is today. And now mercury is a very high-profile environmental issue in the Bay Area, with identification of accumulated mercury in the Bay delta and elevated mercury levels in fish and concern about mercury that was released into the Mother Lode during the early gold rush and concern about mercury in the Coast Range from its natural sources.

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Swent: Tony Cerar and I tramped around for a whole day, looking for a Knoxville cemetery.

Krauss: There is apparently a cemetery. We subsequently--and we'll get to this later down the road--we subsequently sold that property to the Department of Fish and Game, so it's part of the public domain, as the Knoxville Wildlife Area. We rejiggered the boundary lines so that Homestake's McLaughlin Reserve retains the old Knoxville Mine and its workings. But somewhere near that boundary--and we were just talking to Fish and Game about whether it's on what we sold to them or what we retained--is a cemetery. One of the other landowners in the area was aware of its location. And he and Susan Harrison, who's the reserve manager, were going to go out together and identify the site.

Apparently there are a number of non-native shrubs that have been planted around the cemetery that make it more easy to locate. There are some yew trees or evergreen trees that somebody planted to decorate the location. But it is there somewhere, near Knoxville. It was south of Knoxville. It wasn't in the immediate vicinity of the mine or the old town site.

Tailings from the Empire Mine: More Permits

Krauss: The other ancillary activity that I wanted to mention was the use of some tailings that remained in the Mother Lode at the Empire Mine and other related mines in that district. I'm trying to remember the other mine's name. These were underground mines that operated before World War II, some of them quite historic. Most of them used flotation process to recover their gold. They would crush the material and run it through a float plant and collect a sulfide concentrate, and then try to leach the gold out of that sulfide concentrate using a cyanide solution.

The concentrate was rich enough in gold that they were able to recover a considerable portion of the gold, but the residual sulfides retained something on the order of two-tenths of an ounce per ton, which was a relatively high-grade material, even though, through their traditional processes, they couldn't recover it.

But in addition to being a resource, it was also a source of acid drainage in Wolf Creek and the surrounding watersheds. When the state accepted and formed the Empire Mine State Park, they established a State Park Association, which was an independent foundation that had the ability to raise and retain funds for the purposes of improving the historic exhibits and restoring the equipment and developing visitor facilities.

And the legislature gave to the Empire Mine Association the ownership of these tailing piles, with the anticipation that at some point in the future, technology would allow the recovery of their residual gold. I think at the time that was done, there was probably less awareness and concern about the acid release and the heavy metal release into the downstream watershed and more of a focus on the residual gold value of the material.

It wasn't a huge amount. It was--I don't know--forty, fifty, sixty thousand tons, but--maybe it was, like, thirty thousand--I don't remember. But it was brought to the attention of McLaughlin, of Homestake, because our autoclaves were the technology that would allow the recovery of the gold from that refractory sulfide material.

So we did some metallurgical testing on it, and it turned out that it was indeed amenable to processing in our autoclaves, and it also turned out that at the point in time that it became available to us, it was early in the life of the mine, when the sulfide content of the ore available to process was below optimal, and we could really use the additional sulfides to optimize the production of, the operation of the autoclaves. It was well in advance of the time when we created on site our own float plant to develop our own sulfide concentrate.

So we negotiated an agreement to acquire those tailings. I know Dennis and I were involved in it for some time because there was concern that it would be treated as a hazardous waste and its transportation as a hazardous waste would be subject to regulation, so we met with DTSC [Department of Toxic Substances Control] and the water board and others, and persuaded them to identify the material not as a waste but as a product that was being processed for its gold value in our facility.[2]

So ultimately we created a win-win situation. We paid the Empire Mine Association a substantial price for the material. I think we operated on essentially a break-even basis: the gold recovered versus the price paid, including its transportation, were a wash, so we didn't make any money on the gold contained, but we did achieve better productivity through the autoclaves by optimizing their performance and reduced our need to buy acid and to buy propane, so there was a net economic gain to McLaughlin in the avoided costs of acid and propane.

So it was really a win-win situation. A source of contamination in the watershed was removed, and the park association got their funds to use for developing the facilities, and Homestake was able to benefit by optimizing the production of its autoclaves.

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[2] See Robert Shoemaker, *Metallurgical Engineer: Union Carbide, Bechtel, San Francisco Mining Associates; Metallurgical Consultant, 1953 to 2000*, Regional Oral History Office, UC Berkeley, 2001.

Permitting of that turned out to be an extraordinary challenge because--two reasons: one is that this, I think, was Jim Hickey's payback for my having boxed him in on the sediment ponds, and also because he painted it as being analogous to importing grapes for processing in Napa County. He told his planning commission that if they were going to allow us to transport into Napa County gold-containing materials for processing in a plant located in Napa, that that would set a precedent for the wineries to bring grapes from the Central Valley and process them in Napa County and claim that it was Napa County wine.

Obviously, that was not a precedent that they wanted to set. Well, of course, it's only a precedent if you acknowledge it as a precedent, but it became extraordinarily difficult to permit and to persuade them that it was an appropriate thing to allow us to do.

Swent: Where were you transporting it?

Krauss: It came down on Highway 20. We never transported anything on the Knoxville-Berryessa Road. No, it never even came into Napa County. Well, it did. Actually, the last three miles it came into Napa County and we created a storage facility at the crushing pad, and it was blended into the ores that went into the grinding mills.

Also we were able to persuade them that it was appropriate--there was a lot of argument as to whether or not we were importing it for its gold value or its fuel value as sulfur, as avoided cost of propane. And it was really, from our point of view, important to provide the sulfide sulfur that the autoclaves needed to operate efficiently. I don't know. We might very well have done it even if it hadn't contained any gold. We wouldn't have paid the same amount for it, but it was impossible to persuade these guys that it had any value other than its gold and that we were bringing gold ore from somewhere else, and what had been an on-site processing facility was becoming a facility to process other people's dirt from all over the world, and my God, that was abhorrent.

So at the end of the day we did prevail, but--and then we went back and did it a second time. I think the second mine was the Argonaut Mine. Does that ring a bell?

Swent: There is an Argonaut Mine.

Krauss: Near Empire Mine? I'm not sure what the mine was.

Swent: It had a famous fire in the twenties.

Krauss: But its sulfide tailings had very similar metallurgical characteristics to those from the Empire Mine, so I had to go back and argue again with the Napa planning commission that we were not setting a precedent by bringing gold-bearing materials into their county.

And that time, they said, "Listen, this is the last time we're ever going to let you do this." And we said, "Well, to the extent that we need to do this in the future, we'll develop a float plant to process our own material to derive the sulfides we need to optimize the process." So that became kind of the foot in the door to come back. When we added the float plant, it was approved very readily because it was perceived as something they had made us do, rather than as something we wanted to do.

Swent: How did you finally get them to allow you to bring it in?

Krauss: Oh, I think it was just perseverance. We brought the folks from the Empire Mine Association to argue that they really wanted it done, and they needed the money to develop their facilities, and the water board submitted a letter saying that it was a benefit to remove these contaminants from the watershed. We argued long and hard that--I think we actually had to sign a paper--that you know, approval of the right to do this didn't entitle us to continue to do it. I think Al Winters had to sign a waiver acknowledging that it wasn't a precedent to be able to continue to do it in the future. And so I think we finally got around it--and he didn't mind, so it turned out--but it was an interesting exercise, and it was, I believe, a win-win-win situation for everybody involved.

Swent: It didn't affect the wine industry?

Krauss: No, they continued to fight over the definition of a winery in Napa County and ultimately passed an ordinance that does in fact prohibit the importation of grapes from out of county into new wineries, although a number of them are grandfathered and continuing to do that. Certainly that's the industry that drives their mindset with regard to planning and planning restrictions.

From a general plan standpoint, it's reasonable because our mine and its processing facilities were located in the same general plan designation, agriculture and watershed, that a winery and a vineyard would be. They are really the only exceptions to the location of what would otherwise be seen as commercial or industrial activities in an agricultural or watershed district.

Jim certainly had his rationalization in place, but I think he could have chosen to debunk his own rationalization if he had wanted to, and he more than enjoyed making me jump through those hoops over time. It was his payback, I'm convinced. I have never confirmed that with him, but I don't think he ever forgave me for the sediment ponds manipulation.

Swent: You haven't had to have gold appellations yet.

Krauss: No, no, but he got his pound of flesh.

VI COMPLETION OF MINING BRINGS MAJOR CHANGES, 1996

Good and Bad Decisions Made

Krauss: That phase in the process and the evolution of the mine is moving forward to completion of mining in 1996 and the processing of the last of the high-grade autoclavable materials, shutdown of the autoclaves, the conversion of the processing plant from a pressure oxidation leach system to what we call a direct cyanide leach system for the low-grade materials.

This of course entailed another round of amendments to all of our permits, so we had to go back in and revise all of our operating permits to describe this new configuration. We had to revise all our air permits, or our Lake County air permits, to describe this new processing configuration and its emissions. We added additional airflow and cyanide tanks so that there were a number of additional potential sources of HCN to the environment.

All of those permits had to be revisited and reissued.

Swent: Where are you doing the cyanide leach process?

Krauss: In the same tanks that we always did.

Swent: In tanks, not in heaps.

Krauss: No, it has always been a vat-leach process, all the low-grade and high-grade. But the termination of mining and the conversion of the plant, in addition to involving a bunch of permitting, involved a bunch of layoffs because we no longer needed a mining crew; we no longer needed much of the operating crew. Ultimately the work force was reduced from something on the order of 350 folks to something closer to 100. I think today it's down to ninety-five or less, so it was an interesting change in the community, and it was an interesting event for the employees.

And I thought it was handled extraordinarily well by the human relations people, by Don Field in particular, who was Jay Wilkes's successor as HR [human resources] manager. He made extraordinary efforts to make sure that everybody knew about what was coming and when it was coming and what the schedules were and why it was happening.

He put in place what was called a stay bonus, an incentive to stay to the end of the time when people were needed to do the work. I don't know exactly how it worked. There was a certain amount of money each month that was put into an account that would be payable upon their termination should they stay to the end, in addition to their salary.

He formed what he called a transition committee of folks whose jobs were scheduled for elimination. They met and invited the economic development department--the employment department, they're called now, the unemployment department--to come and help them develop job-hunting skills, résumé-writing skills. As a committee they put together a program to essentially market the people being laid off to other mining companies, and they created a résumé book with everybody's résumé in it, and Don mailed that out to all the other operating mines in the Western states.

They scheduled a job fair in Lower Lake and invited other mining companies to come and interview people on the site, and many of them received job offers on the spot. It was really quite impressive.

And throughout this effort, he was able to encourage and promote a very positive attitude. I think that, rather than bemoaning the fact that, "Oh, my God, I'm out of a job. Woe unto me," it was, "I've worked for McLaughlin for fifteen years, and I'm the best there is in this business, and I'm a highly employable, marketable, skilled person, and people ought to want to hire me."

In fact, there was a very, very high level of success at placing people in other mining jobs for those that wanted to move to other locations. Many of the folks that wanted to stay in the area were able to apply their skills to other jobs. I know some of the diesel mechanics, for example, went to work for the major vineyards in their equipment maintenance facilities. And some folks chose to stay in the area and go back to school and learn new skills, just because they liked being in Lake County.

But all in all, there certainly was not a huge influx of unemployed people sitting on the curb in Lower Lake. It was a very, very positive--

Swent: Of course, Nevada mining was booming at the time.

Krauss: Yes.

Swent: It could absorb a lot of them, I guess.

Krauss: But that, in my view, was the best possible way that that transition could have been handled.

Swent: There didn't seem to be any bitterness or--

Krauss: No.

Swent: It wasn't a surprise.

Krauss: It wasn't a surprise, and there wasn't any adverse publicity in the community or bad-mouthing of the company. I think that the real estate values certainly suffered because there were a number of houses that came on the market simultaneously, but they have more than recovered since that date.

I think there were negative components of that transition, too. The schedule for the conclusion of mining was set, in my view, arbitrarily, on a date certain, regardless of where we stood with regard to other activities. I believe it was an August date, mid-August or end-of-August date, and there was the opportunity to have maintained those people on the payroll for another two months and done reclamation work: transport of topsoil, placement of topsoil, completion of ditches, and other things that subsequently we had to bring in outside contractors to do, at a much higher cost than had we just kept our existing equipment running and our existing people around for another month or two.

But that was one of those San Francisco decisions that, despite recommendations from Pat Purtell, who was then manager, to leave these people on the payroll for another month or two to complete these reclamation jobs, the decision was made that no, if you don't give these people a definite date and turn them out then, they're going to make this job last forever. That was kind of, I thought, an unthoughtful view of the world. And we paid for it.

The other negative aspect to this transition, and I'm sure other people will have different points of view on it, was a decision also by Gill Leathley from San Francisco that we should close down the administration building and move the remaining administrative and management personnel to the old truck shop offices. He kind of confused me because the truck shop was a facility that had been heavily used for fifteen years by people walking in the mud all winter and full of dust and rattled by blasting, and it was in terrible shape, whereas the admin building was removed from those activities, in perfect shape, and all of those people were settled in, the computers were running, and the accountants were working, and the bills were getting paid.

But somehow he got it in his--

Swent: It was also closer to Lower Lake.

Krauss: Yes, it was a shorter commute. It was tied into the communications system. In order to make the move, we had to expend a huge amount of money to extend phone lines and refurbish the building. I think the original estimate was that it would cost a few tens of thousands of dollars to make the transition, and it ultimately cost closer to $800,000 to close the admin building and move those people down to the truck shop.

But what offended me--and I think it wasn't an intentional discussion--but one of the times Gil came from San Francisco and talked to the managers, I had the audacity to say, "Well, I don't understand why we're closing the admin building and moving to the truck shop. What's the point of this?"

And he said, "Well, we've got to change the McLaughlin culture."

And I think he said it without thinking, but I think it was very revealing of his point of view. You know, I think, having come from Corona [Mining Company] and not been party to the development of McLaughlin, I think his view of McLaughlin, that it was not hardcore traditional mining, hierarchical management, and all of those things that I've talked about earlier as, in my view, being really positive attributes of the McLaughlin culture, were things that he thought were inappropriate. He also didn't favor our high-profile environmental success story. Kind of a knee-jerk reaction from the old traditional miners to assume that you couldn't have an environmental success without having to spend excess money doing it.

The truth of the matter is that it didn't cost--just like the acid containment--it didn't cost any excess money; it's just that we talked about it differently or we did better planning than other people. It wasn't any real cost burden on the project.

Swent: Possibly there's a national thing. Corona was a Canadian company, and Gil is what?--a New Zealander, isn't he?

Krauss: I don't know. I don't remember. I thought he's a Scotsman. And he had worked in Africa and he worked in Canada, and he had come down here. But he was certainly steeped in what I consider to be the old culture of mining. I didn't really think about it at the time; it rung in my ears when I heard him say it, and it was probably later that night, driving home, when I thought, Change the McLaughlin culture? Here all along I thought that the McLaughlin culture was very successful. And if ain't broke, why do we have to change it?

And I also thought, Well, what was the origin of the McLaughlin culture? Well, Jack Thompson was the origin of the McLaughlin culture that you're proposing to change, and he happens to be your boss, and isn't that ironic? But Jack in his management style did not ever want to interfere with the activities of his staff. He gave Gil freedom to do it the way he thought he ought to do it, and he didn't intervene.

And I'm not sure that anybody ever really acknowledged the total cost that it took, other than the people at McLaughlin that had to pay it and supervise it and manage it, the total cost of having "changed the McLaughlin culture." But ultimately I decided, on reflection, that I was very offended by that decision personally, and resented it. It has probably affected my attitude about the company since then.

But then it wasn't my job to make that decision. It was his job to make that decision. Maybe he was aware of lots of relevant information that I wasn't privy to. I don't know. There's always that possibility.

Swent: I certainly couldn't figure it out, just as a housewife, to consider moving from that admin building, a nice-looking building --why move five miles further and change everything?

Krauss: The rationale was that from here forward, the bulk of the cost of operating this facility is in the crushing and grinding, and consequently it makes most sense if we consolidate all of our activity around our major cost center. You know, there was an engineering rationale for doing so, but it made no practical sense.

Here you have Judy Kaufman, who had worked out there, as the most dedicated, meticulous accountant, a time keeper who had, without I think a single error for twenty years, made sure everybody got their paycheck on time, and now she's got to park and walk through the mud to get to her office. Is that a cultural change that is positive? I don't think so. Certainly she wasn't happy with it. It didn't reward her for her dedication over the years. Besides, she had to drive an extra five or six miles to and from work every day and pay that cost.

So anyway, it was a peculiar point of time.

Pat Purtell Handles Well the Toughest Watch

Krauss: Pat Purtell, as general manager, I think handled it extraordinarily well. He was never one to criticize the decisions that he was kind of forced into implementing, and he was able to maintain a positive, upbeat spirit in implementing them. In contrast to Ron Parker's tenure as general manager, Pat really has had the toughest watch because he had to shepherd us through the layoffs and the transition from 350 employees to 150 employees or 100 employees, and the transition from the admin building to the truck shop, and the emphasis from production to closure and reclamation.

Throughout that period, he had to repeatedly defend the viability of continuing to process the stockpiled ore. At least once a year or twice a year, somebody from San Francisco would decide that now that the McLaughlin autoclaves weren't running any more and the damn thing had never made money anyway, we ought to just shut it down.

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Krauss: I was just beginning to say that there were repeated charges that the continued processing of the accumulated low-grade ore was not economic and the mine should be just shut down, and it was very hard to persuade people that if you were to just shut down the operation, leaving all that low-grade, acid-generating, sulfide-rich low-grade ore stacked up there that you would have substantial reclamation costs, and the cheapest way to reclaim that material was to continue to process it.

So far as I know, and certainly Pat and others would have to verify it, the processing up to this point, even at the depressed gold price, has provided a positive cash flow, and if you couple that with the avoided cost of having to encapsulate and reclaim ten or fifteen or ultimately twenty million tons of low-grade ore, it's certainly the smarter thing to do.

Swent: And the human benefit, keeping a few more people employed.

Krauss: Well, there's always that benefit, too, but I don't think that's sufficient justification in and of itself. If it were cheaper, truly cheaper to reclaim that material in place and close the operation, at the current gold price, that would be the appropriate decision, but it only made economic sense if you ignored the cost of reclaiming it and dealing with its acid potential in perpetuity. Of course, there was a tendency to want to ignore that.

Can we take a break? We could move forward then and talk a little bit more about reclamation and closure and the university relationship.

[lunch break; tape interruption]

Krauss: I guess we last talked a little bit about the transition from full operations to low-grade direct cyanide processing and the end of mining, the reduction of the forces, and the move to the truck shop, and Pat Purtell's watch, which has certainly, in my estimation, been the toughest because it's both economically been really, really tough because it was the end of the life of the mine with the lowest grade material to process, and also accompanied by yet a further decline in gold price.

Swent: You mentioned that he had to defend continuing to process the low-grade ore.

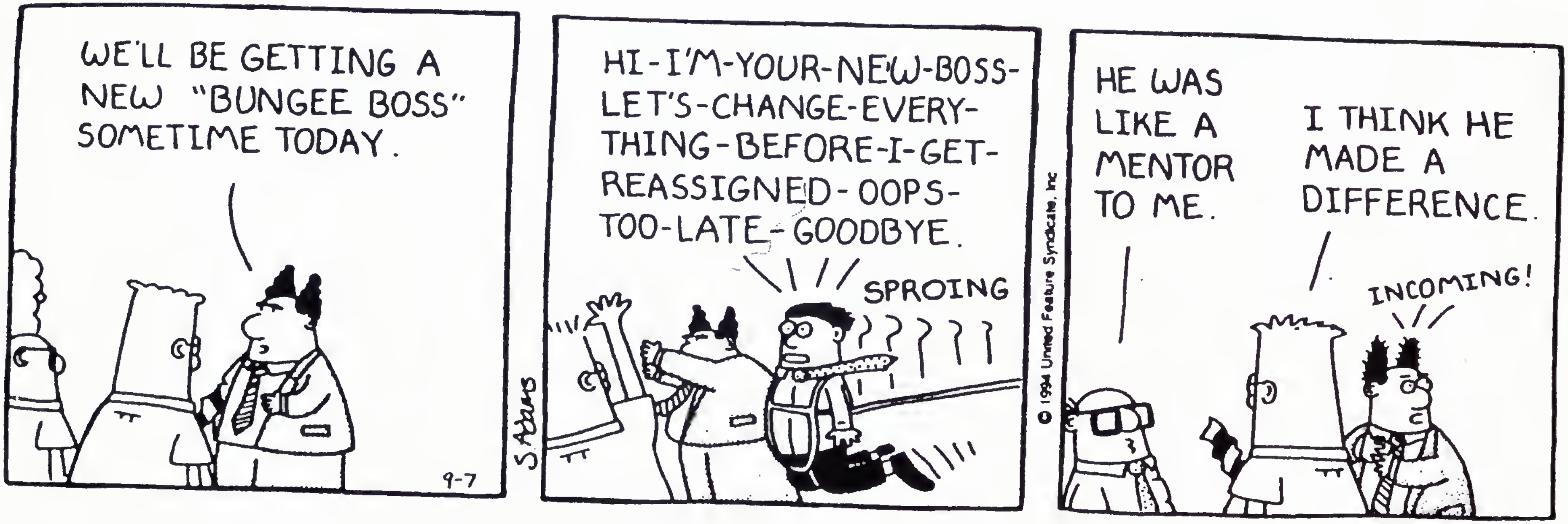
Krauss: Yes. One of the things that we kind of joked about in the field operations, looking back at our San Francisco group, was that we had quite a string of what we called VP-ops, vice presidents of operation, or presidents who had operations responsibility. The direct boss of our general manager changed with substantial frequency, I guess. I think in seven or eight years we had five or six VP-ops. Of course, everyone that came in had to ask all of the same questions again, and we had to re-answer all of the questions that we had just answered for the previous VP-ops.

Really, the two questions that got asked most frequently by most operations VPs were: "Is it economic to process the stockpiled, low-grade ore, particularly what we call the green ore, the bottom end of the scale?" which Pat and the mine engineers and geologists had to respond to. And the other was, "Why the hell are we letting the university use this site?" which I had to answer. So I have re-justified that whole closure scenario dozens of times.

In fact, it got to be such a point of conversation, this rotating of operations Vps, that when this Dilbert cartoon came out: and the first panel said, "We'll be getting a new bungee boss sometime today."

And the second panel: the boss comes springing into the frame with the word, "Sprong" over his head, and he says, in rapid succession, "Hi. I'm your new boss. Let's change everything before I get reassigned. Oops. Too late. Goodbye."

And the third panel: everybody looks at each other and the first says, "He was like a mentor to me." And the other guy says,


WE'LL BE GETTING A NEW "BUNGEE BOSS" SOMETIME TODAY.
9-7
S. Adams
HI-I'M-YOUR-NEW-BOSS-LET'S-CHANGE-EVERYTHING-BEFORE-I-GET-REASSIGNED-OOPS-TOO-LATE-GOODBYE.
SPROING
HE WAS LIKE A MENTOR TO ME.
I THINK HE MADE A DIFFERENCE.
INCOMING!

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"I think he made a difference." And the third guy looks over his shoulder, and he says, "Incoming!" [laughter]

So we thought that was really appropriate for our relationship at McLaughlin to the frequent assignment of new responsibility in San Francisco. But Pat certainly has had the tough assignment in terms of his watch as general manager. But just like all the others, he has risen to the challenge.

Just after completing the plant conversions and getting it up and running and optimizing the throughput, it became clear that we could improve the performance of the last few years of the project by replacing the then-radial stacker by a much larger stacker and larger belt that would allow us to increase the throughput through the crusher and increasing the throughput through the grinding circuit.

We found that we were approaching the permit limit of 8,000 tons per day, so once again we went back and sought to modify the permits, one more time to increase and alter the project, this time to expand the throughput limit up to 10,000 tons per day. That required us to amend the air permits in both districts and at least to seek acknowledgment from the counties that that was consistent with their earlier approvals.

I think Pat has done a magnificent job in maintaining the morale of the troops that he has, and he's got a great team of people that are keeping the place running, including Kent Bilhartz, who has been on site for a long time in the capacity as a mechanical engineer and now maintenance supervisor. He's an electrical engineer. He's really responsible for assuring that all of the equipment there continues to run, which is increasingly difficult, obviously, as the facilities age and wear and become less reliable.

The operating superintendent is a woman, which is probably still unusual in the industry. Mary Sonderstrom was her maiden name. I'm not sure what her married name is. But she worked originally in our metallurgical group and then transferred over into the operations group.

I know Norm Birdsey is still part of the operating crew, who's another one of the folks you have interviewed in this series.

Swent: A nice fellow. He came from Creede.

Krauss: I've always enjoyed him over the years. He's always had a real interest in the environmental activities on the site. Actually, at one point, he came and talked to me about--when we made the downsizing and transition--whether or not there would be an opportunity for him to work in the environmental department. He had that much interest in it.

John Mack, a mining engineer. Everybody fills multiple roles in this greatly reduced management team, but John is comptroller and manages purchasing and procurement and accounting and budgeting and strategic planning, as well as supervising a lot of the outside contractors, who are now employed to complete many of the reclamation tasks that remain to be performed.

And Dean Enderlin, whom you'll be talking to, made the transition from chief geologist to chief environmental engineer and is now very well handling, fulfilling the duties of managing the everyday monitoring and compliance. I think Dean has the longest job description I've ever seen. He's the only person left on site that--well, I guess he and John--who can do the mine engineering that's necessary to schedule and plan for the re-mining of the stockpiles, and he supervises the surveying that still has to be done, and he's the only geologist left so he's the only one that can really get up there and look at the material coming out of the stockpiles and make sure that the right material is getting mined and processed. He does quite a bit of the computer work on site. We keep laughing about the fact that he has got a twenty-six-page job description with all the things he does.

And he's ably assisted by Sarah Robertson, who's a Davis graduate who now manages the air quality program. Sarah was a Cobb resident who first worked at the mine as a student intern of the environmental department and then after she graduated came back. I believe she worked in the laboratory for a couple of years, and when Dolora moved on and Jim Jackson moved on, she interviewed and was hired to carry on part of the environmental program.

And Bob Kalis, who is the environmental technician that manages all the water sampling--.

I guess it's always another one of those questions always asked by the incoming VP of ops: "Why is it that you have so many people doing environmental work on site?" But to the extent that our other operations employ fewer people, I think it leaves the job partially undone, and there have been repercussions for that. But it's a pretty lean team for the amount of work that needs to be done and the amount of work that needs to be done is, I think, just that that's adequate to protect the interests of the company.

One of the things that Phil Barnes taught me when he worked as my chief environmental engineer--and Phil is certainly--he's my reference. When I think about having a conscience about these things, he's the straightest shooter I've ever had work for me. He would not ever bend a rule or look the other way on anything. He pointed out to me that at a certain point, when you keep whittling down your monitoring program, you're no longer in a position to defend yourself from unfounded accusations that you're creating environmental damage.

You can cut back your number of stations and your frequency and your number of parameters only so far until you create such big holes in the monitoring program that you're no longer in a defensible position. And the cost of maintaining whatever that minimally efficient program, or optimal program, is and the risk that you entail is not a reasonable tradeoff.

So I think what's now being done on site is appropriate and barely adequate to achieve that standard of protecting Homestake's interest from unfounded accusations of environmental damage.

Swent: Where is Phil now?

Krauss: Phil went from McLaughlin to Lead, and he was the environmental manager at Lead for a number of years. I know I spent quite a lot of time working with him and talking with him and visiting with him on that, and it was a totally different perspective on environmental management because it was an old mine with many, many years of operation without the same environmental standards as are now common.

He was forever playing catchup. His first comment when he went up there--he called me the week after he got up there, and he says, "You know, Ray, this whole plant is built upside down!"

I said, "What do you mean?"

He says, "Well, you know how at McLaughlin we built everything so that gravity would carry everything into containment?" If anything ever failed, it would go into the tailings pond or it would go into a containment pond, and nothing could leave the site. He said, "Well, this place was designed just the opposite. It was designed that everything *could* leave the site. Everything went to the creek, and the tailings went down the creek, and if anything spilled it joined the tailings and went down the creek." And he says, "Now, after 150 years, I have to turn the whole place upside down."

Swent: And they were pumping everything up.

Krauss: Everything was being pumped up, yes. It was a real interesting insight into that whole issue of containment and designing for containment and using gravity as your friend rather than your enemy.

He has since left Homestake and is now working for--it's now owned by Anglo Gold, recently acquired by Anglo Gold, the Cripple Creek venture, the Cripple Creek-Victor joint venture in Victor. I think he's quite happy. It used to be Independence Mining. It's now part of Anglo. He's doing a good job there. And I think he spent a long time in Colorado and was pleased to get back to Colorado.

Working as a Contractor on the Final Closure Plan

Krauss: With regard to reclamation, much of the reclamation, of course, is completed. The waste dumps are really shaped and resoiled and revegetated. We still are introducing woody plants to the waste dumps. Dean is doing that work. He's dedicated to--he's kind of a Johnny Acorn planter, I guess. He's gathering native seed and directly planting woody plants throughout the dumps and other disturbed areas.

I'm now working as a contractor rather than employee, providing services to Pat in completing the final closure plan that identifies all those tasks remaining to complete the closure and reclamation of the site and scheduling those tasks. That plan will shortly go before each of the three counties and the water boards for their approval. So we have yet one more round of continuing discussions with this network of regulators.

Swent: Are any of the people still there that you started out dealing with?

Krauss: There may be a few. You know, not in the same position. In an organization like the Regional Water Board, people who were junior engineers when we started are now in upper management or middle management.

Swent: But there has been some continuity?

Krauss: There is some continuity. I mean, some of the folks at Napa County planning are still in the same position they were in twenty-five years ago. Jim O'Loughlin and Will Selleck. But many of them have retired and moved on or moved into other professions.

Swent: So you have to re-educate.

Krauss: Well, we have had to do that throughout. I've often told the folks on the water board that they ought to pay us for educating all their engineers because over the years they have a policy of changing the assignment of their water quality engineers every two years, so in seventeen years of operation we trained eight of their engineers, none of whom had had any prior exposure to mining. So yes, part of the care and feeding of the network is educating new regulators.

One of the interesting questions in the closure plan is developing a scheme for closing the tailings pond. Tailings closures are generally fairly expensive exercises. Depending on the nature of the contained material and the nature of the site, they often require some sort of a cap or barrier to prevent water from moving through the tailings and transporting contaminants into the groundwater.

Again, we have a unique opportunity here because the tailings site is located in such an impermeable basin, it doesn't really require a cap. When we had originally created the reclamation plan, we designed a traditional closure, which involved evaporating and dewatering the tailings and shaping them so that they would have positive drainage off the tailings, and covering them with a capillary barrier, with a rock barrier that would prevent moisture from migrating up to the surface, and then placing two feet of soil--potentially a very, very elaborate engineered cap to turn it into a dry grassland.

Swent: This would drain into Hunting Creek?

Krauss: The surface water would drain into Hunting Creek, yes. And we had to make sure that we had provisions to isolate any surface runoff from the reclaimed surface from any seepage that might rise up out of the tailings as they consolidated because, since they were contained in an impermeable basin and nothing would seep down, then consolidation would cause more water to move upward into the surface.

We have since revisited that whole question, and based on the fact that those tailings have been situated there for almost twenty years now without any evidence of movement into the surrounding groundwaters or any release into the surrounding surface waters, the rationale for draining and capping the tailings is really no longer warranted. And not needing to keep it dry and drained, it is possible that we could, rather than reshaping it, we could reclaim it as a bowl, as a wetland, and ultimately save a lot of money by adapting our reclamation plan to that configuration.

So that's what we're working on. We've got a test plot where we're currently--in fact, this week the contractor was supposed to mobilize to distribute soil by slurrying it onto the surface on kind of a filled test plot, a tailings test plot filled with real tailings.

Swent: And this is topsoil that you had--

Krauss: This is topsoil that was stockpiled during the original construction, after argument with Davy McKee.

I'm hopeful, and I think it will work, that we can actually, rather than picking up that topsoil and trucking it and dumping it and pushing it with bulldozers, as you would in a traditional construction project, that we can actually screen the rocks and sticks out of it and mix it with water and pump it as a slurry onto the surface of the tailings pond and resoil it in that manner and save probably more than half the cost, several million dollars of the cost of closing that facility, and ultimately coming up with a really interesting habitat that would be a mixture of grassland and permanent wet areas, with intermittently inundated areas in between that would support a whole variety of species that are dependent upon those kinds of unusual habitat conditions.

Swent: Haven't these topsoil piles revegetated themselves by now?

Krauss: Well, we originally revegetate them in order to prevent it from eroding. But you've got a million tons of topsoil with a little bit of grass on top that's not going to get in the way, and it's no great loss.

Covering the tailings by slurrying, so far as we can determine, hasn't been done elsewhere, and yet it's kind of intriguing because it replicates a natural process. The development of alluvial soils is exactly that, the transport of soils--

Swent: Where would you get the water for the slurry?

Krauss: We would just recycle the water that's in the tailings pond. The pond itself will remain as a zero-discharge facility, so that any stormwater that accumulates in it will stay in there. So it's not critical that the quality of the water be suitable for discharge into the downstream watershed, only that it not be toxic to wildlife or inhibit the growth of the vegetation. The testing and the work that we've done and the ecological risk evaluation that we've performed suggest that we shouldn't have any problem with toxicity from anything in the soil. The only real issue is whether or not the level of soluble sulfate in particular will be high enough to inhibit growth of the plants.

Welcome To The
Donald & Sylvia
McLaughlin Reserve
Managed By The University of California, Davis
U.C. Natural Reserve System
Established January

Raymond Krauss and Sylvia McLaughlin, April 24, 1999.

Welcome To
The Donald & Sylvia McLaughlin Reserve
Ray Krauss Field Station
Established August [illegible]

Raymond Krauss at Ray Krauss Field Station, McLaughlin Reserve, April 24, 1999.

We did one test plot earlier, and it just grew like gangbusters. It was wonderful. We have film of it before it was once again inundated by the rising tailings pool, but it had a wonderful mixture of cattails and willows and cottonwoods and families of ducks and salamanders and frogs and red-winged blackbirds. And the vegetation--we put really quite a thin layer of soil on that. We put maybe six inches of soil on it, and the vegetation grew right through the soil into the tailings and really flourished because of the availability of moisture in the tailings well into the dry season, so it stayed green well into the summer.

As the water level fluctuated, the cattails would die back and then regrow the next year, and revegetating it was a snap. We hydroseeded with grasses to make sure that those areas that were above water level had vegetation on them, but all of the wetland species, all the riparian species are propagated by windblown seed, so most of that was self-revegetated.

We did actually, on a very windy day, go upwind of the pond with some cattail heads and rubbed them around and released all the seeds and let them blow out over the pond. I don't know whether that helped or not, but it may have. It certainly made sure that we had plenty of seed source. But the willows and the cottonwoods and the other things invaded within the second year, without any conscious attempt to introduce them.

I would like to think it's one of those solutions, another one of those win-wins that make good economic sense and makes good ecological sense.

Swent: People are so eager for wetlands these days.

Krauss: Yes. And we have even looked at the possibility that once it's created and established, that we could, since it's a newly established wetland, we could sell mitigation credits to other people that are disturbing wetlands, to offset their disturbance and pay for the closure of it. But that's kind of a fantasy.

McLaughlin Natural Reserve, A Research Station

Krauss: The other big component of this closure plan, of course, is the transition from an active mine site to an environmental research station. I think we described earlier how the reclamation plan provides that the site be used as an environmental studies station and how we have worked over the years with the University of California to encourage their participation in our monitoring and other activities, in order to foster early development of a relationship that would make that a productive use of the site.

Bob Matthews, who I mentioned earlier was a colleague of mine in the seventies on the mining board, was the first chair of the McLaughlin Reserve Committee. He worked very hard to introduce other members of the Davis faculty to the opportunities of using that site, and to bring classes up.

The leadership of that group has since transitioned to a whole new generation led by Dr. Susan Harrison, who originally came to the site as a graduate student maybe ten or twelve years ago. Her research at the time was on serpentine-related butterflies, butterflies that were related to serpentine indigenous plants. She had worked all over the state in serpentine habitats and had identified six such critters, six different species of butterflies whose host plants were serpentine indigenous.

And she was absolutely astonished to find that all six of them were present at McLaughlin, whereas she only found three or four at most in any other location in the state. So she very quickly became a great proponent of the establishment of the UC Reserve.

The development has been slow. Working with the academic community is not an overnight phenomenon, and reasonably so because you have a faculty who have years of commitment to a particular area of research and an existing research program that has its own location. It's like Charles Goldman and his group at Tahoe. They have been doing that same work for thirty years, and when money comes along to do further work, why, you go back to where you have worked before. It's very hard to get a committed faculty member to undertake research in a new location.

But as turnover has occurred within the faculty, many of the new faculty have found it intriguing to focus their research activities and to point their graduate students to conducting their research at the McLaughlin Reserve.

Susan is now the chair of the University Reserve Committee, and she has brought on a reserve steward by the name of Virginia Boucher, otherwise known as Shorty, who has a great deal of energy and enthusiasm for promoting this project. We have developed a wonderful relationship with the campuswide Natural Reserve System office, including Alex Glazer, who's the head of that group.

Liza Riddle, before she moved on, was the assistant to the head of that group, actually the acting head of that group.

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Swent: Liza recently moved on to the Trust for Public Land.

Krauss: Of course, creating a legal framework for the university use of a site disturbed by a major mining project has not been easy. The legal work has been done by Dennis Goldstein and an attorney from the UC system by the name of Pat Schlesinger. They have both really worked very, very hard to sort all of the responsibilities and indemnities and opportunities and legal aspects of the relationship between the university and Homestake. And it does work out very well.

I think from Homestake's standpoint--I did an analysis earlier on for Jack and Wayne Kirk [Homestake counsel] of strategies for managing closed properties. And working particularly with Wayne Kirk, it became clear that under federal law, a company never loses responsibility for the environmental consequences of their mining activities, so because we have waste dumps and tailings ponds there, we will always be responsible should they in any way fail or their containment fail.

If we were to sell those sites to other users who somehow breach the containment features that would allow the release of that material, the company would still be responsible.

Swent: Wayne Kirk told you that liability is forever.

Krauss: Liability is forever, yes, under CERCLA [Superfund] and other statutes. And even if we, Homestake, were to have sold the property to another party and obtained from them an indemnification against any of their activities that might release tailings or waste or otherwise damage the environment, that indemnity is only as good as they have resources. So in light of those considerations, we all concluded that it was really in the best interest of Homestake to continue to own these properties in order to maintain adequate control of them to prevent them from becoming a liability to the stockholders.

Another question becomes: well, if we're going to own it, that's going to involve costs of management, and how do we deal with issues of trespass and common liability? The cost of owning and maintaining a piece of property--is that a burden forever, or what do we do? It seemed that that concern dovetailed very nicely with the post-closure land use of the site by the university because many of those duties and responsibilities are fulfilled by someone else using the site. Trespass is not a problem if you have a bunch of university people occupying and researching on the site. They're not going to want trespassers messing with their research plots anyway, so that gets taken care of as an incidental benefit of permitting them to enter upon and use the site.

Similarly, the maintenance of fences and roads and other facilities on the site will become a shared obligation between Homestake and the university, and not the sole obligation of Homestake, so there are additional cost benefits in terms of post-closure holding costs for the company from sharing use of the site with the university.

The university was really very excited about access to the site because of its accumulated environmental data, starting with the development of the baseline data and the topographic mapping and geologic mapping and vegetation mapping and all of the surveys of rare plants and the twenty years or eighteen years of meteorological data and seventeen years of aquatic ecology data and water quality data.

It's one of the most thoroughly studied and characterized pieces of landscape in the world. Of course, if you're coming in to study some particular aspect of ecology, having all of that other information describing the rest of the parameters that might affect your hypothesis already in hand saves you the trouble of doing it, so people are real excited about that as an opportunity.

The university has just really blossomed in the relationship. There are now several dozen researchers active on the site even as we continue to operate. They have acquired all of our baseline data and actually digitized it so it's now available for use by their other researchers. And they're actively pursuing funding from a number of sources, including the possibility of integrating the McLaughlin site along with a number of other reserves into a major federal effort to establish a network of ecological monitoring stations that would be available to monitor such things as global warming and its ecological consequences.

It would involve annually the granting of several million dollars to the university, a good portion of which could be used at McLaughlin. So it's an exciting, very exciting prospect, at whatever level of intensity that ultimately develops, but it shows great promise at this point.

Swent: I was just going to say, this is just one unit in a statewide reserve system.

Krauss: Yes, there's a campuswide--

Swent: This is not just UC Davis.

Krauss: That's right. The natural reserve system involves reserves throughout the state, and then they assign particular campuses the responsibility for managing each one. This one comes under the purview of UC Davis.

It's a real attractive site to them, not only because of its environmental data but because it comes with facilities. It has already buildings on it that are usable as laboratories and offices and dormitories. As they went through a complicated evaluation process to determine whether or not this site was suitable for inclusion in the reserve system, one of the factors that they pointed out was that those reserves that had such facilities get the highest level of usage.

But it was a complicated process. They had a number of people from different campuses come in and conduct surveys and write evaluations and consider the possibility of the McLaughlin site in comparison to other sites, to fulfill their research and education mission, and ultimately decided that ecologically this was the ideal location to fulfill their needs as well as--the fact that there was already the environmental baseline data and the facilities on top of that was really a cincher.

Swent: But, now, this was part of your original plan, the reclamation plan that you had way back in 1980.

Krauss: Yes.

Swent: But you committed to this without knowing that Davis would want it or would take it; is that right?

Krauss: Yes, but we kind of cultivated that seed and made it grow over the years. But I think--you know, there was--

Swent: What did you have in mind in 1980?

Krauss: Very much what's developing as a field station. In my graduate education I spent time at a number of field stations: the University of Michigan field station in Pellston, in northern Michigan, which has a number of lake and riparian and woodland habitats; and the University of Colorado's Front Range research station in the Front Range of the Rocky Mountains near Arapaho, which has a series of ecological study and meteorological study stations at different elevations so that you can compare the ecology at different altitudes.

You know, it seemed clear in my mind in the very beginning that this was a potentially valuable resource from an educational standpoint, but when we first went to the universities to seek their support in the permitting process, they agreed that it had wonderful potential but they were certainly not in a position to commit to what they might do twenty years in the future.

That was certainly one of the ongoing conversations that I had with Jim Hickey in Napa County, "Well, what guarantees do we have that this highfalutin scheme you've got, Mr. Krauss, is ever going to be implemented?" And "Trust me" was not an adequate response. So we had to constantly--we had to report on an annual basis all of the classes that came out and all of the professors that used the site and everybody that visited the site, all of the reports that were written and all of the theses that were prepared, and continue to reassure Napa County that we were making progress towards implementing this scheme.

Swent: Was there ever any pressure for a golf course or--

Krauss: I think we talked about that a bit in the earlier interview a couple of years ago. We did consider, with the counties and the Environmental Data Advisory Committee, the whole range of possible uses of the site, including development and resort development and recreational use--

Swent: Or just get up and walk away.

Krauss: Yes, just return it to farmland, ranchland. Those were all possibilities that were considered, along with the possibility of the research facility, educational facility. Everybody seemed really quite taken by the idea of the opportunity to have it available as an educational resource. Everybody for different reasons, I think. I think Napa County felt that an association with an academic community was appropriate to their view of Napa County. Lake County was very happy that there might be some continuing employment associated with the site.

Yolo County was certainly comforted by the idea that university researchers would be observing the environment and there to sound the alarm should some catastrophe be about to occur.

Swent: Was there a thought of an arrangement with the state college system?

Krauss: At that point there was no commitment to any particular--it was just to any educational organization. Sonoma State was involved in visiting the site, brought classes out, but I guess really it's one of those things that just evolves as a consequence of who you know and relationships. Bob Matthews was probably instrumental in promoting the idea as an adjunct of the Davis campus. And it makes sense because of its proximity and other relationships.

Swent: And Susan's relationship, too.

Krauss: Well, she's now on the faculty. She's no longer a graduate student; she's now on the faculty, and that's her principal area of research, and she's got half a dozen of her own graduate students doing work there. She has received over a million dollars' worth of grants personally to conduct research in the region. She certainly sparkplugged the evolution of that idea.

Part of the question that we fought with was how do you guarantee the university has the certainty of tenure that allows them to commit public resources to the building of facilities? So we came up with the idea of inviting the Land Trust of Napa County to become a partner in the agreements that authorized the university's use of the site, and we have developed and are about to enter into a dedication of a conservation easement to the Land Trust of Napa County. Homestake would essentially deed to the Land Trust any rights of further development of the property in the future, rights of subdivision or its commercial development or its industrial development, and thus restrict its future use. The university felt that they were comfortable that the site couldn't be sold out from under them and used for other purposes.

John Hofnagle, the executive director of the land trust, has been instrumental in shepherding that agreement along and really quite important to the process. It has been kind of an interesting three-way negotiation between the university and Homestake and the land trust.

Part of the point of this effort, really, in my mind has been to maintain a positive relationship with the community, to maintain some political leverage with the communities who had to approve or have to approve our closure plan. It's the continued feeding and caring of the network, I guess.

One of the difficulties that most mines face is as they enter into their closure period and their economic benefit to the community diminishes or ends, they no longer have any political leverage in the community. I have always described it to our management as “planning for the end game.” I think that's terminology that comes out of a different profession. But how do you disengage yourself from this obligation in a way that's positive? And really what is your legacy? How will it look when you look back on it in future years?

So the strategy to engage the university and the land trust has really been very, very important in maintaining the positive political relationship we have with Napa County in particular and Yolo County and the university in particular. Really, between the two groups it encompasses all of those people who might otherwise be antagonistic to Homestake's closure activities, and rather than focusing on "Oh, my God, what's going to happen with those waste dumps and tailings ponds and mine pit?", it's "Oh, my goodness, what a wonderful future we see in this educational facility."

The McLaughlin conservation easement is the biggest single conservation easement in the history of the Land Trust of Napa County and it almost doubles the lands that they can tell their constituents they have protected. They in effect become the promoters of our closure effort in telling the community how effective they have been in achieving their conservation objectives.

The Blue Ridge-Berryessa Natural Area Conservation Partnership

Krauss: Another element of this closure scenario, this end game, has been to really look at our surplus property as an asset to help maintain the feeding and maintenance of our network. Most predominant in that has been the Gamble Ranch, or what we now call the Knoxville Ranch. It was never, or the bulk of it, at least, was never subject to the permits and therefore not subject to the obligation to commit that property to the reserve.

We did talk to the university and asked them if they felt there were some environmental or ecological reason that it would make it desirable to include the Knoxville Ranch as part of the reserve. They kind of shuddered in horror and said, "Boy, we've got our hands full with the first 6,800 acres and another 7,000 acres would be over our limit."

So in lieu of that, we thought that the best way to assure that we had the support of the community was to seek the feedback from the community as to how they would like to see that land managed in the future. I worked through the Department of Fish and Game and the now retired regional director, Brian Hunter. I met with him and talked to him about the company's interest in disposing of the land. I was kind of casting around for ways that it could become a conservation property, that its natural values could be protected and preserved and yet it would still return some income to Homestake.

Whatever its disposition, it needed to be well received by the community. We talked a little bit about whether it could become a mitigation bank for habitat disrupted in other areas, but it didn't appear to be politically a reasonable possibility simply because those areas where development is occurring that would otherwise require mitigation are not in Napa County, and this property was in Napa County. And it's hard to persuade people in Solano County to charge their developers money to protect land in Napa County.

But I asked Brian if I could host a meeting of all of our neighbors and all of the public agencies in the Department of Fish and Game to seek their input on how we would deal with this Knoxville Ranch, and he agreed. So I sent out notices to neighboring ranchers and the Bureau of Land Management, that manages the bulk of the land surrounding the McLaughlin property, and the Bureau of Reclamation that administers the land around Lake Berryessa downstream from the McLaughlin property. The Department of Fish and Game, state parks, Napa County, Lake County, Yolo County. And then the Onstads from the Morgan Valley Ranch and the Gambles from the Gamble Ranch and the Todds and the Lauffs from the Todd Ranch.

We all sat down, and I explained, "Gee, you know, we've got this surplus property. We would like your suggestions on how we deal with this in the future and how we dispose of it because the company now views it as surplus land and a disposable asset, and we don't want to do it in a way that will be contrary to the community's interest. What can you tell us?"

We had quite a lively conversation. About halfway through the conversation--

Swent: When was this?

Krauss: This would have been '96, late '95, early '96, the middle of '96. George Gamble spoke up, and he said, "You know," he said, "I think it's ridiculous that we're just talking about the Knoxville Ranch. We ought to be talking about the whole region. We ought to be talking about everything from south of Lake Berryessa on Highway 128 all the way to Colusa County and Highway 20."

Swent: Had you primed him to say that?

Krauss: I had not, no. I was knocked out of my shoes. I had no idea that he had this thought in his mind. I had known him for years and talked to him for years, but I had no idea that he had this idea. And then he started going down the list of property owners, starting at the south, along the east side of Lake Berryessa and moving north. "Herb Gunn is eighty-six years old, and he tells me that he wants to make sure his ranch stays the way it is, and he hasn't made arrangements for its transition to the next generation, and the next ranch is for sale, and Todds' is for sale, and the Lauffs' is for sale, and now you're telling me the Knoxville is for sale."

He says, "Hell, prices out here--for a few million dollars, we could preserve this whole area." [laughs] People perked up and looked at it and chatted about it. It really changed the focus of the discussion from what do we do with the Knoxville Ranch to what's the context of this whole region.

So we agreed to meet again.

Swent: Where did you meet?

Krauss: In the Department of Fish and Game in Yountville, in their conference room, and we continue to meet there. The university folks got involved, the reserve people, because certainly this involved their future in the region. It turned out that at UC Davis there was another group interested in the region called the Putah-Cache Bioregion Project, a group of professors in landscape architecture and other departments who had gathered together to develop a curriculum, a multidisciplinary curriculum, that focused on the culture and art and history and environment of the Putah Creek and Cache Creek watersheds. So we connected with them, and they got very excited about the possibility of integrating their program with this discussion about the future use of lands in the area.

Early in the discussion, the Bureau of Reclamation brought up the fact that the concession agreements for private uses around Lake Berryessa are now fifty years old and are about to expire in the next four or five years, and they were about to enter into what they called a public services plan, planning process that would revisit the nature and management of the public services provided around the lake.

Swent: They're federal, aren't they?

Krauss: Yes, as is the Bureau of Land Management. The Bureau of Land Management was just completing what they called their Cache Creek management plan. They were involved on the other side of McLaughlin, in the Knoxville recreation area, with quite a dispute between themselves and Napa County about the future of offroad vehicle use of the Knoxville recreation area.

It seemed like there were a bunch of lands, both public and private, where there was a shared vision of future conservation and preservation, and all of a sudden, I think in the middle of these conversations, it became evident to everybody that if we would work together in pursuing our individual objectives, we would be more likely to succeed than if we worked independently.

At one point or another we articulated that as the goal of the group, to support each other's individual efforts to fulfill their designated missions, be they private landowners or public land managers. So gradually this group evolved into a partnership of folks that either own or are responsible for managing all of those lands that extend from the south end of Lake Berryessa into mid-Colusa County, including Bear Valley and Wilbur Hot Springs and the old Cherry Hill deposit, which started this whole legacy with Homestake's interest in the Coast Range.

In fact, we negotiated a donation of the last bit of land that Homestake owned in Colusa County at the Cherry Hill site to the American Land Conservancy for inclusion in a conservation project they had going that included Bear Valley and the wildflower display that they wanted to protect in that region.

Swent: The American Land Conservancy?

Krauss: Yes. Harriet Burgess's group. It's a spinoff of the Trust for Public Land. The upshot of it all has been, after long hours of debating what we should call ourselves--I had started out calling it the Coast Range Natural Area, but people were uncomfortable with that. It was not specific enough, and everybody would think of Mendocino County when you talk about that. So we ended up picking those geographic features that are most prominent in the area--Blue Ridge and Lake Berryessa--and called it the Blue Ridge-Berryessa Natural Area Conservation Partnership.

It continues to flourish, in the context of that partnership, once we garnered the support for public acquisition of the Knoxville Ranch from Homestake. Initially the Bureau of Land Management felt that they could raise the funds to acquire that ranch by what they call a pooling agreement, selling surplus lands, little bits and pieces of lands that remain in the public domain around Napa County that were isolated and inaccessible for public use and of no value to the public domain.

It's a process that they had used in Colusa County to acquire other inholdings within the Cache Creek Resource Area. And so they contacted the Trust for Public Land, at the suggestion of then state director, Ed Hasty, whom I had worked with over the years, and TPL got involved in trying to organize the sale of the surplus lands and the acquisition of the Knoxville Ranch.

The process kind of dragged on, and as the price of gold declined, folks in San Francisco got anxious about needing the money and wanting to consummate the sale. I think apart from Jack there was certainly not the same commitment to this closure strategy, this end-game strategy that I had been promoting over the years, that I thought was essential to the successful closure of McLaughlin.

It's another one of those things where it was paid lip service. I actually wrote it up in very detailed fashion and presented it to Homestake management, and we had a meeting, and everybody agreed that that was what we were going to do, but all of a sudden, in the midst of these discussions with the Trust for Public Land, I get this call from I guess it was Wayne Kirk or Denny Goldstein saying that San Francisco had made the decision to put the Knoxville Ranch on the open market and to hell with all these other considerations.

Swent: Oh, dear.

Krauss: I said, "Well, that certainly has a cost, and it needs to be considered before you make that decision. And before you implement that decision, I would like to have the opportunity to at least have Pat and myself come down and talk with Jack and others and see if that's really what's in our best interest."

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Krauss: Whatever its motivation, it did have the benefit of lighting a fire under the process, and I went back to the group and I was able to persuade Wayne to say, "Well, we'll give you another"--whatever it was--"three months, and if you don't have the deal in three months, then we're going to sell it on the open market."

So I went back to the group and said, "We've got a crisis we've got to solve right away. We're going to have to get this money together and acquire it, or the plan is not going to go as we proposed."

It was really Brian Hunter from the Department of Fish and Game that said, "Well, we're not going to let *that* happen." And he said, "I think this whole Blue Ridge-Berryessa thing is the best thing in my entire career, and I'm going to make sure that this opportunity doesn't slip through our fingers." So he got engaged in--

Swent: The ranch is sort of in the middle of the whole area, isn't it?

Krauss: Well, the McLaughlin property is smack in the middle of the whole region, and the ranch really ties Lake Berryessa to--it connects a bunch of other public lands. It's an inholding in what's otherwise public domain. But Brian took the bull by the horns, and he said, "Well, I think that we can get this on the radar screen for the Wildlife Conservation Board to acquire it on behalf of the Department of Fish and Game."

I'm trying to remember who suggested approaching the Packard Foundation for part of the funding, but ultimately the Land Trust of Napa County made an application to the Packard Foundation to provide half the funding, and the other half of the funding was provided by the Wildlife Conservation Board. After long and arduous negotiations and title checks and other transactional processes, the escrow finally closed late this last summer, and the Knoxville Ranch is now the Knoxville Wildlife Area, owned and managed by the state Department of Fish and Game as a significant unit of the Blue Ridge-Berryessa Natural Area.

The natural area group continues to meet. We have obtained a small planning grant from the Packard Foundation to do kind of a quick and dirty economic survey of what are all of the potential public uses and what are the opportunities to generate revenues from those public uses from the region, and what are the costs of managing these uses.

Swent: What's your role? Are you being paid by them as a consultant?

Krauss: No, I'm not. I'm actually participating as Homestake's representative, and I kind of serve as the facilitator of the group. Since I started it, they kind of accepted me--

Swent: You certainly were the catalyst for it.

Krauss: I have kind of been accepted as the facilitator, and I've taken it upon myself to document the proceedings of the group. We wrote a vision statement, and discussed and debated and edited it until everybody reached a consensus on what that should be, and then I've started the process of developing just a compilation of all of the individual accomplishments of the partners: what conservation easements have been obtained, and what public acquisitions have been obtained, and what research monies have been spent, and what habitat improvement has been done. And it's huge. It's huge. It's a very, very impressive compilation.

So, when the American Land Conservancy was seeking monies to do habitat restoration on the Bear Valley Ranch, they were able to say, "We, as members of this partnership, who have accomplished all these other things, seek your additional funds to do this other thing that will add to this." It is a very, very persuasive tool to other foundations, other private agencies, other government funding agencies.

There has been involvement by the Resource Conservation District to assist the private landowners in protecting their stream banks and enhancing their forage value and reducing star thistle and other noxious weeds.

We're in the phase now of developing a proposal to conduct a planning study for the whole region, again in partnership between the Bureau of Land Management and Packard Foundation. BLM has offered to pay a substantial portion of the cost if Packard Foundation will kick in some of the money. The idea is to do kind of a regional planning framework that would identify how all these pieces of landscape fit together and what stewardship practices are appropriate to their future management, and provide a basis for integrating them, at least the public lands within the area, into a single management unit.

The Bureau of Land Management and the Bureau of Reclamation are conducting a study to see if the responsibility for the Lake Berryessa area might better be transferred to BLM, which would begin to consolidate that area, the responsibility for managing that area. Congressman Thompson, who I think we have talked about earlier, both in his role as Assemblyman Thompson and State Senator Thompson, now our Congressman Thompson has said that he would certainly support the designation of the region as a national conservation area if we have a consensus of the community that that's the appropriate thing to do.

There's beginning to be an awareness beyond the immediate area that this public-private partnership is a very useful model for developing a constituency of interest in what historically have been top-down conservation efforts. Instead of Mr. Clinton [President Bill Clinton] coming in and saying, "I'm gonna call you a national monument. You can take it or leave it," now here you have just the opposite happening. You have a group of local folks saying that we would like to become a nationally designated conservation area because we think it's in our best interest.

I have been most impressed with the interest and role and support of the private landowners. I'm kind of puzzled about that, but it turns out that the public land management process over the years has really ignored the interests of the adjoining private landowners, just by oversight or lack of intent or whatever. The private landowners have been very, very frustrated and unable to communicate with and influence the decision by the managers of the adjoining public lands.

Swent: What has been the source of their difficulty?

Krauss: Trespass. Mostly in the Knoxville area it has been offroad vehicles that are using the public lands, trespassing on the private lands, trespass of hunters from public lands onto private lands. In their view, attracting unsavory individuals to enter upon and use the public lands in a way that's threatening to their health and safety, and not adequately supervising the use of the public lands to ensure their protection, either the land themselves or the neighboring lands.

Swent: I know that those ranchers down on Lake Berryessa have been very upset, but I was never clear on what the problems were.

Krauss: Part of it is just that underlying suspicion of government: "What the hell are they doing with my money anyway?" Part of it is certainly based on real concern about largely trespass issues, but also the fear of the BLM proposal, for example, to expand and promote the use of the Knoxville area for even more offroad vehicle use. The neighbors are saying, "Oh, my God. The use that you've got up there is out of control. We're going to oppose this with our last breath."

In the context of the partnership, we have been able to sit down and talk about those issues. The BLM has agreed to back off substantially from their proposal to expand the use of that area. Private landowners see a direct benefit by participating in the partnership, gaining better access to and control over the use of the public lands in the area.

Swent: There was something, too--and I can't remember now--a problem over the water level on the east side of Lake Berryessa, where those ranches are, during the drought when the lake went way down.

Krauss: I don't know. The Bureau of Reclamation does in fact own the area around the lake and there is, on the east shore of Lake Berryessa, a cooperative plan between the Department of Fish and Game and the Bureau of Land Management and the private landowners to develop some wildlife habitat along the lake, and they have fenced off the edge of the lake. I think there's some joint hunting interests as well associated with the creation of this habitat. And there's been a lot of discussion, if we can work it out so that it's not incompatible with any of the neighboring ranches, to reintroduce tule elk and pronghorn antelope to the east shore of Berryessa and the Knoxville Ranch and the rest of the area.

Benefits to Homestake and a Broader Global Strategy

Krauss: From Homestake's standpoint--and I'm not sure whether--I know Pat certainly understands and values the benefit of this whole end-game strategy, post-closure strategy and the care and feeding of the network of people that we need to support us through closure. I'm not sure that it's fully understood by the folks in San Francisco, though I keep trying to remind people.

But from my view, it certainly preserved the company's leverage in the political process as we go through closure. If you were to go to any of the three counties and ask them what they think of Homestake's presence and whether or not they would favor Homestake's requests in the closure plan, I think we would get a uniformly positive response.

We just made a presentation to the Yolo County Board of Supervisors regarding the Blue Ridge-Berryessa partnership. They were just so enthusiastic. They kept asking, "Well, can't we pass a resolution in support of what you're doing?" Or "Isn't there something more that we could do to support and promote this effort?"

And we said, "No, but when there is, we'll let you know."

But what I've scheduled is an informational presentation to the boards of supervisors in each of the three counties in advance of our submittal, Homestake's submittal of its closure plan, so when the closure plan comes in, it comes in as kind of a component of this much bigger future vision of our legacy in the area.

Swent: The beginning of something good.

Krauss: The beginning of something new and positive, and not the threat that my goodness, the company is leaving the community and they're leaving behind this big hole in the ground and these toxic pits, you know? It has put a totally different public view on the company's legacy in the region. I would like to think that it's something that we could, working elsewhere, with some lessons learned, that we could apply elsewhere. I think it's a concept that's directly applicable to the broader global debate about what is sustainability as it relates to mining.

People have struggled with that because it seems to be an oxymoron. If you're exploiting a finite resource, when it's gone how can it be sustainable? I think if you just broaden your perspective and understand that by sustainability we're really asking what's our legacy, what is it that remains when the finite resource is gone and does that promote the sustainability of community and the environment, and that becomes pretty obvious.

Really, over the years I have listened again and again and again to the National Mining Association and its leaders talking about the virtues of mining in third-world nations, saying, "Well, we're bringing modernization and economic development to third-world nations." And certainly that opportunity is there, and sustainability in that context is leaving behind an infrastructure in a community, and schools and hospitals and trained individuals who are able then to continue that development process, who lay the framework for future development. And it has always puzzled me that we haven't been, as an industry, more proactive in those situations in saying--I think more recently some companies are. I know BHP [mining corporation] has talked about this at conferences, of working with the local communities in developing a legacy, a sustainable future, and using the development of the infrastructure to support the mine to provide the basis for future economic development in the area.

But it would seem an easy thing to do, at least in the rational world, to negotiate a partnership between a third-world government and a mining company that as you develop this mine you will develop certain elements of the infrastructure, the port facilities and roads or electrical generation capacity, all of which is adaptable to some future planned use, just as the McLaughlin site is adaptable to use by the university and support for the region and its legacy as a conservation area.

Swent: Do you suppose in some place like Indonesia, though, that the government even cares?

Krauss: Well, that's the real dilemma. The other model would say if you're going to come in and mine in my country, so long as you put X dollars in my Swiss bank account, it's cool. Then the real dilemma for the mining company is what obligation, what moral and ethical obligation do we have to intervene in the politics of a third-world country to suggest that they should promote social development as opposed to the enrichment of some dictator? It's real hard to conclude that a company has the obligation to promote the social development of the country when some other company will come along and say, "Well, to hell with that. We'll put the money in your Swiss bank account. Don't sign an agreement with them. Sign an agreement with me."

So I don't know how to deal with that dilemma. I think it has to be dealt with on a cooperative basis among the major mining companies and say we won't undercut each other in those circumstances where the result is going to be a negative legacy, the consequences for which we will all have to pay in the future. Is that restraint of trade? I don't know. [throws up hands] But I think it's certainly an appropriate conversation to be held at some national, international forum.

But anyway, that kind of brings the McLaughlin story to its current state and puts it in the context of what I would hope to think of as its future legacy.

Swent: Well, it's certainly a good one, at the moment anyway, a wonderful legacy, I think.

Krauss: Well, time will tell. [dog barks; ...] continue to [dog barks; ...]. It's still an exciting opportunity, I think. I'm still enjoying my participation in the process and learning from the activities every day. I'm really kind of looking forward to this next phase of the Blue Ridge-Berryessa planning effort, this development of the framework plan for the region. There's a whole bunch of individual planning efforts that are all converging together. It's really kind of interesting. We may have catalyzed it, but the timing was perfect. Each of these individual groups was--it is a convergence of interests. It's a convergence of self-interest, that everybody can see the benefits of participating in this partnership.

Swent: I wanted to ask you--you managed, I think, to allay the suspicion of the mining people. Are you still considered a traitor by some of the environmentalists?

Krauss: I don't know. You'd have to ask them. Frankly, I don't care. I'm not uncomfortable in any way with the role that I've played.

Swent: You have more than fulfilled your responsibility.

Krauss: You've got to do what you've got to do. I do get beat up by my colleagues in the industry for being too cozy with the environmentalists. But I think that narrow view of--

Swent: You've done a remarkable job of pulling all this together.

Krauss: Well, it ain't just me. Really there are individuals who have made it possible where it never could have occurred: people like Jack in his position kept the opportunity open to do things in a way that was different from the way it was done before. It's such a huge undertaking. It involved so many people. If we just sat down and listed the names of all the people that have in one way or another contributed to the process, it would be in the thousands. I just kind of swam along on the current.

Swent: You were at the right place at the right time.

Krauss: It has a lot to do with it, yes. It has been a fun trip, and continues to be a fun trip.

Swent: Yes. Do you want to talk about CMA [California Mining Association] and other things, or is this enough for now?

Krauss: Do you have more tape?

Swent: I have more tape. That's no problem! Because this isn't all that you've been doing. Your state and national presence has been considerable.

Krauss: You know, I think maybe we better take a break.

Swent: Okay. Well, this is a good place to wrap up for now, then?

Status of the Closure Plan, 2001

[Interview 5: July 11, 2001] ##

Swent: We're continuing an interview at the Strouse Press Room in The Bancroft Library on July 11, 2001. When we finished our earlier session, we had fairly well wrapped up the McLaughlin project, I think.

Krauss: Yes.

Swent: You had said, just as we were finishing, that it still remained to be seen how they would develop the final closure. How has that gone?

Krauss: I think the only thing that has really occurred since the last interview has been a thorough review by Homestake's current management of our closure proposal, and their approval and acceptance of that, so we are proceeding to implement the closure as we discussed it earlier, with the university licensing the mine site itself for use as an environmental field station. We have completed negotiations on the use agreement, the details, the relationship between Homestake and the university. We've also completed the negotiations on the conservation easement that commits the property to not be developed but to be used exclusively for the university's field station, and we're beginning now the discussions with the three counties and the water board and acquiring their approvals on the technical issues, too: the physical, final reclamation of the low-grade stockpile pads and the process area, tailings closure, and those elements. So it's all proceeding as intended, and Jack and the rest of the management team have signed off on it.

Swent: Did the three county boards of supervisors have to approve it?

Krauss: It will go back to them this fall. We intend to submit to the counties in October, the beginning of October. We have been meeting with them and having tours. I've had tours on the mine site with their planning commissions and the new supervisors. We always have a changing cast of characters, so everybody needs to be reintroduced to the project and newly introduced to the project.

Swent: Is there anybody who has been there all through? From the planning--

Krauss: You know, it's kind of interesting. Napa County just went through a political upheaval in which they fired their planning director, and the replacement is a former planner, Charles Wilson, who went to work in the county administrator's office for the last twenty years. He was involved in--he was actually, I think, probably the first Napa County planner to work on the project, and now he returns to the department in the role of director for the last chapter of the project, so that's kind of ironic. There are a few people that do have continuity, but not a lot.

Swent: There is some continuity, then.

Krauss: It's the exception, certainly.

Swent: And in Yolo County?

Krauss: No, I don't think--well, again, there are contacts there, though they're shifting roles. When we opened a storefront office in Woodland, our landlord was Tom Stollard, who's now a member of the board of supervisors, so there are certainly people that have been part of the communities in which we've had a presence over the entire period of time, but like all of us, their roles have shifted over the years.

Swent: So some of your spade work of twenty years ago is still important.

Krauss: Oh, it always is. Yes, I always tell people that there's never a contact or a conversation or a good deed that goes unrewarded. That's all part of the caring and the feeding of the network that is important. I've never regretted the time spent with anyone who had interest or curiosity about the project.

Swent: There were just a few things that I wanted to pick up on from earlier. You had said that you had not reread, or read, the other interviews in this project. I went back to them now, and most of the people really praised you highly; even your opponents gave you grudging praise.

Krauss: Uh-oh. [laughs]

Swent: I shouldn't have said grudging. I think it was genuine. They did praise you. John Ceteras said that you were just right for the job, even though he was on kind of the other side of the fence, but he admired your skill in presenting your side of it.

Krauss: I think the respect is mutual, too. Certainly we over the years continued to discuss these things and work together on other efforts and--but you can agree to disagree on some things in this world and still respect their position.

Swent: I did pick up one thing that I thought we should mention. It came in a couple of the interviews, but John Ceteras was perhaps a little more articulate. I think he was talking about that famous event at the Guinda Grange Hall. The presentation.

Krauss: When the helicopters showed up with the Hill & Knowlton press team?

Swent: Right. And Ceteras said in his interview, "Some of the stuff they tried to do backfired. All this video taping and bringing out all the suits and the hot shots." And then he said, "There were us in our jeans and overalls, and there were them in their Armani suits and Gucci loafers and their piles of documents." My experience with the Homestake execs is that they're not the Armani suit and Gucci loafer type, but that was the impression.

Krauss: No, but certainly--it doesn't really matter whether they were Armanis or Brooks Brothers. The fact of the matter was they weren't overalls. I don't think that--it was certainly something that I wished at the time hadn't occurred.

Swent: You mentioned that in your earlier interview.

Krauss: It wasn't something that Jack or I or anybody working on the project had orchestrated. I'm not sure exactly; it was kind of the public relations firm operating relatively independent and out of control. But certainly in quite a number of hearings we had technical experts, and we had to have technical experts, engineers, hydrologists, and geochemists, and metallurgists who needed to be present to respond to the technical questions, particularly of the water board or the air board, where you have more technical proceedings than the land use proceedings. And those guys wear suits, so to some extent that's unavoidable. But certainly the video and the helicopters and that kind of stuff--it set a tone early in the hearing in Yolo County that--I knew it the moment I saw it was happening that it was an obstacle that we were going to have to cope with for a long period of time.

Swent: It seems to have been overcome eventually. One of the Homestake people, Rex Guinivere, described you as "the gung ho, kill them dead, anti-industrial type and environmental person." That is how he had you characterized.

Krauss: Well, that may be a little extreme, but certainly Rex, I think, typified the construction group, Rex and Klaus Thiel and others. Of course their responsibility was pretty single-mindedly to move forward and get the thing built in as quick as possible time and at the least possible cost.

Swent: Short-term cost.

Krauss: Short-term cost, yes, and I don't think any of that engineering group really had much of a sense of the bigger picture: the community relationships or the environmental requirements or the consequences of having--of disregarding commitments, or the consequences, the long-term consequences, of violating a permit. They thought it was all pretty bizarre and extraordinary that we had to do those things, but certainly I was always pro-Homestake and pro-industry.

Even in my work in Sonoma County, I made a point of assisting the geothermal developers and the gravel miners and the lumber millers to make their way through the permit process, and didn't throw obstacles at them. I've always believed that as a society, we depend upon our resources, and the only issue was, how do we go about providing those social needs, those cultural needs, in a way that's environmentally acceptable? And I think in the long run, the record speaks for itself.

I think I may have mentioned it in one of the earlier interviews, but if I didn't, I will do it now. Klaus Thiel, who was the project manager on behalf of what was then Davy McKee, now Kvaerner, went from working on the Homestake project to Indonesia working on the Lihir project, and he brought a group of--what were they, Kennecott people?--one of the joint venture partners--through McLaughlin--this must have been five or six years after we started up--to look at the autoclaves, because they were looking at autoclave technology to be applied there. I ran into him in the hall, and he looked at me and shook hands and he said, "Krauss, at the time I thought you were a pain in the ass. But now that I've thought about it, I could use someone like you now." [laughter] So certainly there were some hard-fought differences. And I certainly--I guess I was forceful in presenting the point of view that I represented, and ultimately, I think, probably stepped on some toes along the way, but prevailed, and I think appropriately so. But they're welcome to their opinions, too.

Swent: Another point that I thought you might want to address: again, it was John Ceteras who said that he felt bad that Homestake never acknowledged the community pressure to clean up the Reed Mine.

Krauss: I'm not sure what he meant by that because we--

Swent: He said, "Homestake took full credit, very grandiose credit. It would have been nice if Homestake had acknowledged us."

Krauss: I'm not sure what he's thinking of there. I know that when we did that we talked to the newspapers and we said that we were doing it in response to the desires of the community.

Swent: I saw a press item that explicitly said that. I remember.

Krauss: We invited John and others to come observe the cleanup. Perhaps it was just in the tone of what we did or something. I'm not sure what gave him that impression, but clearly it was done as a gesture to the community, to be responsive to something that they felt was important.

Swent: It wasn't necessary for the money.

Krauss: It was not an obligation of Homestake to do so, although it might have later become so, had we not done it then.

Swent: I think on the whole it seems that you accomplished very skillfully what you tried to do, which was get community support for the effort.

Krauss: Well, I think it's perhaps more so than in contrast to other mining efforts. There's a tendency to allow these community relations to become polarized. If you look over the last few years with the New World project outside of Yellowstone Park, or the Nicollet project in Wisconsin. You can click them off: the Crown Jewel in Washington State that Battle Mountain has been pursuing there. They're all very, very contentious and all very, very polarized.

I'm often asked, if we were to start McLaughlin today, would we not end up in that same kind of polarized circumstance, and I still believe that it's possible to avoid that kind of polarization. It's possible to reach out to a community. The key, really, is the timing. Far too often, folks wait until they've already done their exploration, or they've already come up with a conceptual plan for what they want to do before they talk to the community, and by then, the community has already formed their own opinion of what they think is going on, so getting engaged in that dialogue before you even begin your exploration, or as you begin your exploration, is really quite key.

Swent: Maybe that's a good place to move into some of these other topics. Have we covered the conversion of the buildings all right? You haven't had that much to do with that anyhow, have you?

Krauss: I think a lot of that is still pending. The university is finalizing their plans.

Swent: Yes, that's up to them, what they will do to it.

Krauss: Yes. Exactly.

VII WORKING ON STATE AND NATIONAL AFFAIRS

The Chiles Award Gives National Credibility

Swent: I don't think we have mentioned the Chiles Award that you had received. That's a national award.

Krauss: That's an award that is sponsored by the Chiles Foundation of Portland, Oregon. It's awarded by the High Desert Museum in Bend, and it recognizes the kinds of things that we did: the development of environmentally sound management practices applied to resource projects in the context of developing a community consensus. It was, I believe, 1993, and I was very honored to have been selected.

Swent: How did that come about?

Krauss: Well, it was curious. Charles Goldman, Dr. Goldman, is the limnologist at UC Davis, who had dealt for many years with Lake Tahoe and the limnology of Lake Tahoe and its relationship to the surrounding land use. He had been the recipient in '92, and he nominated me in '93. Doctor Goldman and his graduate group is also the group that has done the mercury studies on the McLaughlin Davis Creek reservoirs, so I had known him through that context and he was generous enough to nominate me. Then I went through the process and I was selected. That was exciting because there was a ten-thousand-dollar stipend attached to that award. That was a serious award, unlike a lot of these plaques that get handed out over the years. I was very tickled; I was very pleased.

Swent: It was given to you on three counts, I believe: for minimizing the environmental impacts of mining, and limiting the costs of environmental compliance, and gaining public support.

Krauss: Yes. I think that's the kind of criteria that they applied to selection.

Swent: Right. And then the Joseph Holmes commendation, I believe, was given to the project. That was a safety award.

Krauss: There were a number that were given to the project.

Swent: BLM gave the "Partners in Public Spirit" award.

Krauss: Yes, that's a Department of the Interior award; then-Deputy Secretary of the Interior Bill Armstrong came out and made that presentation, and that was quite nice.

Swent: So it has gotten a lot of national recognition, and as a result of your work here at McLaughlin, you've gotten a lot of national and state exposure and had a chance to spread your philosophy pretty widely.

Krauss: Well, it's been a good foundation to--it provides the credibility that allows me to participate in the national dialogue on things like general mining law or the 3809 regulations.

Swent: Shall we move on to that now?

Krauss: Whatever you want.

Swent: Well, let's do, because this has come up just the last few days, again, in the press a lot. The 3809 was a regulation that was promulgated--

Krauss: Yes. I guess, maybe the way to bridge that is just to say that as the--a couple of things happened. As McLaughlin went from permitting and construction into operations and began to develop a reputation of being environmentally sound, we began to be placed on the tour circuit, also because we were close to San Francisco.

So groups like the American Mining Congress, then, subsequently, the National Mining Association, and the Gold Institute and others, who were engaged on behalf of the industry in lobbying and educating the legislators and the congressional folks and their staff, particularly their staff, would periodically arrange tours, mine tours.

McLaughlin became a regular stop on those tours, and I had the opportunity to serve as tour guide for those. Also in the context of--EPA has been working, I believe, since 1978 on developing mine waste disposal regulations, under the non-hazardous portions of RCRA [Resource Conservation and Recovery Act of 1976]. For many years, for several years, they had what they called the dialogue group which consisted of industry members and environmental community folks and others, and they came through

McLaughlin at least twice, trying to reach a consensus on what would be appropriate regulations for the disposal of mine waste.

Swent: There was a very critical time when it was designated non-toxic.

Krauss: Non-hazardous, yes, yes.

Swent: Non-hazardous.

Krauss: And that, exactly that. That work was done prior to my activities on the state and national level, and I think led largely by David Crouch in his role as chairman of the American Mining Congress, Solid Waste Committee. I think we spoke about that earlier.

Swent: Yes, we did.

Krauss: And it was a result of that determination that it would be regulated in non-hazardous waste under, you know, subtitle "D" instead of "C" or whatever, they began the process of generating the rules that would apply and it has yet to be resolved, but it did give me an opportunity to begin to meet the congressional leaders and the staffers. George Miller came out, Congressman Miller; he was then chairman of the House Natural Resources Committee. As a consequence of our discussions there--and he was very active in trying to do some revisions on the general mining law--he invited me to come back to Washington and join in a dialogue with the environmental community on mining law reform, along with other members of industry. David Baker, from Newmont, I remember, was there, and a couple of others; [there was] a lot of heat and not very much light.

National Research Council to Review the General Mining Law

Krauss: The issues of general mining law reform and 3809 regulations and mine waste management have been debated in the public policy arena for twenty years without resolution, and they continue to be. The reference to the 3809 regulations: those are the Bureau of Land Management regulations that implement the general mining law. It came up in the Clinton administration under Bruce Babbitt. And basically, it was his initiative and the absence of being able to--

He was the Secretary of the Interior, and in the absence of the ability for Congress to reform the mining law, he decided to take it upon himself to do it administratively. His chief solicitor, John Leshey really drove the charge on that. It had been kind of a personal crusade of his throughout his career to, I think as he would describe it, “bring the mining industry to heel.” The battle back and forth between the administration and Congress took the form of amendments on the appropriation bill, where Congress would say, You cannot revise the 3809, you can’t spend any money to revise the 3809 regulations. Or you can’t adopt new 3809 regulations until after a certain time has passed. It went back and forth. At one point, Congress did require that before the bureau could amend the 3809 regulations they had to acquire a study of the effectiveness of the current regulations to be prepared by the National Academy of Sciences. It was the Academy’s National Research Council. They have a council on earth sciences. It’s another hierarchical organization. They do routinely, in conducting such studies, assemble a committee that consists both of National Academy members and also others that are engaged in the field to bring some outside points of view.

I was nominated; actually, they told me after the fact. I got a call from one of the staffers with the committee, asking me if I would be willing to serve, and he said, “I’m not supposed to tell you this, but you’ve been nominated by the BLM and by the industry and by the environmental community.” And he said, “I can’t figure out how you did that, but I figured I’d better talk to you.” I don’t know who did that, but I suspect I know in BLM and industry’s part where the recommendation came from; I’ve never figured out where out of the environmental community, but it was certainly an interesting opportunity for me to participate in that effort.

Swent: That is a wonderful tribute to you. What did it involve?

Krauss: It was an eleven-member committee and it involved--the congressional charge was to review the effectiveness of the current 3809 regulations at protecting the environment and to make recommendations for what, if any, changes ought to occur. There were some other details on the charge: to take a look at whether or not the timeliness of the permitting of mines could be improved, and things like that. The committee held public hearings across the country. It was a fast-track study; I think we were convened in the early spring, and the report was issued in six, nine months.

Swent: My, that must be a record.

Krauss: Yes. Usually it’s a two-year process. But we held hearings in Washington and in Denver and in Spokane and visited mines and took testimony and collected information and reviewed the existing regulatory structure and developed a fairly substantial report.

Swent: That’s that beautiful book.

Krauss: The *Hard Rock Mining on Federal Lands* that was published.[1] The interesting thing, I thought--well, a couple of things. The process by which it was assembled was certainly fascinating, and I really am intrigued by the National Academy approach.

Swent: In what way?

Krauss: They assemble a committee of very diverse points of view, and your first session is spent having what they call a bias discussion. You're sitting around and you say all right, this is my background and my training and my point of view, and these are the biases that I bring to this committee effort. It's a very interesting thing to do one's self, just to examine one's self for bias, and to hear other people do it, and to gather some sense of how the diversity of the committee mixes and matches and fits together.

Swent: Who chaired it?

Krauss: It was chaired by Perry Hagenstein.

Swent: From the National Academy?

Krauss: From the academy. He was a member of the earth sciences committee, yes. It included a couple of folks from industry, and an attorney, a couple of academic types that were clearly environmentally oriented. Ann Maest, who's a geochemist who formerly did work for an environmental group and Duncan Patter from Arizona State University.

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Krauss: One of the early discoveries in the process was that there's precious little good information about the environmental performance of mines on federal land. The BLM couldn't even provide an inventory of the mines that they had authorized and by no means was anybody systematically collecting information on the occasions of environmental releases or environmental failures, or failures to reclaim, or bankruptcies and abandonments or spills into the landscape. There was just no database against which to judge the success or lack of success of the current regulatory scheme.

So one of the recommendations made was that they keep track of what it is that they were doing, that they were responsible for, which seemed to be a no-brainer. The other thing that was interesting to me was that here the administration in Washington was proposing wholesale revision of these regulations in the absence of any information about what worked or what didn't or whether or not there were really any problems. One of the things that we discovered very quickly was that the folks in the field had a very good handle on what was going on within their districts and within their regions and within their states, but the higher up you went in the food chain, the less knowledgeable people were, and yet those were the people who were insisting that the regulations needed to be changed. And my personal satisfaction was enhanced by having gotten a sentence into the report that basically said that: that those folks charged with the responsibility of advising Congress and who had the most need to know, knew the least, whereas those people in the field that dealt with these things on a daily basis knew the most. That little sentence has since gotten quoted a number of times. Thrown into Mr. Leshey's face, I'm sure, a number of times.

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[1] Committee on Hardrock Mining on Federal Lands, Committee on Earth Resources, Board on Earth Sciences and Resources, Commission on Geosciences, Environment, and Resources, National Research Council. National Academy Press, Washington, D.C., 1999.

But in the absence of information, what we ended up doing was developing what I think turned out to be a piece of original work, which was: what are the elements of a regulatory system, the necessary elements of an effective regulatory system in terms of information and monitoring and feedback, and that then became the template against which we measured what was or was not occurring on the landscape. Did the regulations actually provide for and include the necessary elements? Which was really all we could do in the absence of any good information on what was, in fact, going on. So I think it ultimately was an interesting piece of work.

Swent: This could apply to a lot of other things.

Krauss: Yes, it's fairly generic. One of the fallacies, I think, that political leaders, public policy makers, employ in trying to regulate these things, was not looking at all of the elements. The idea that my constituents believe that there's an environmental problem, and therefore the way to fix it is to pass a new law, is very naive. There are lots of laws on the books, and they don't make a bit of difference if you don't have all of the other elements, if you don't have the regulations and the ability to enforce them and monitor to determine whether or not they're working. If Congress doesn't give the BLM the money to administer the laws they've got, how can they expect them to make it work?

So the law is just one, one little piece of the total system, and without the total system, it's meaningless. It's a hard lesson to get across to the people, though, because so long as you can tell your constituents, we fixed that, we passed a law, then they get reelected, and without anybody counting, without any feedback, without anybody knowing whether or not the law is, in fact, working, then they get reelected and everything goes on and no change occurs.

It was really fun working on. We did that report entirely by e-mail. We would write our chapters and send them in to Washington, and they would compile them all and send out the next version. I think we went through--we must have gone through twenty or thirty versions of that report before it was finalized, and I think I must have accumulated a couple thousand e-mails back and forth over that six-month process of completing that report. It's interesting to author a book by committee, and to reach a consensus of the committee on its contents.

Once again, it turned out that I was instrumental in negotiating that consensus, because things were beginning to diverge between the mining interests and the environmental interests. Perry and the staff kind of turned to me and said, gee, is there some way we can describe this that we can get both of them to sign off on? And we were able to.

Swent: How did you do it?

Krauss: Well, it's not a simple explanation, but we moved some of the environmental--. A lot of the environmental "disasters" that the environmental group wanted to describe were no better documented than the environmental "successes," so we were able to persuade them to describe those as potential environmental consequences of unregulated mining or inappropriately unregulated mining, or unsuccessfully regulated mining.

To the extent that we could document circumstances where they did occur, document them, but not to condemn the industry based on the potential to destroy the environment. And that seemed to satisfy folks. But every chapter was negotiated hard and long before we finally had it done.

Unfortunately, I think my colleagues in the industry take comfort from this effort because the conclusion in their minds is, well, everything's fine. Regulations work and there are no environmental problems. And that's not at all what the report concludes; the report concludes that we really don't know whether or not there are problems. I think in fact there are significant adverse environmental consequences occurring from some, not all, but some modern mines, despite the fact that as an industry we make the argument that it's only those old abandoned historic mines that hurt the environment, that these new modern mines do not.

There are probably a dozen examples of modern mines that have had unexpected acid drainage that is yet to be corralled, or have had cyanide releases, or have had groundwater impacts, or have had bankruptcies and reclamation failures, and the bonds have been insufficient. So as an industry, we still haven't really cleaned up our act. We haven't really confronted the reality of the problems that we face and figured out how to deal with them. We'll always be characterized by the bad actors, but there are some very significant bad actors out there. I'm not sure why that attitude prevails.

I just went through an e-mail discussion through the Northwest Mining Association, where I'm currently sitting as a trustee. The Seattle newspaper, I don't know if you saw the series, just ran a three or four part series on mining, and again, promoting the reform of the general mining law, and saying this ancient law is not protecting the public interest either economically or environmentally, and rolling out the examples. And they are real examples, there's no doubt about it. One of my fellow trustees wrote an e-mail back saying, I don't know what they're complaining about. They say that according to their figures, there are 500,000 abandoned mines in the country and they can only document five of them that are creating environmental problems. Now that's a pretty good percentage. You know, it's not going to sell. It's not an attitude that's going to help.

Swent: Percentage doesn't matter.

Krauss: No, I mean, we don't expect some percentage of our bridges to fall down or some percentage of our schools or hospitals to collapse on their patients or students. And of course the percentage doesn't reflect the scale of the consequences of the failing mines or the costs involved. Somehow we have, as an industry, yet to come to grips with that reality. And I think that's true globally, too. We haven't come to grips with that reality. Ok Tedi is still discharging its tailings into the Fly River and to the extent where there's documented copper impacts on the Australian reefs, out a thousand, two thousand kilometers away. There are just too many examples of disregard for the environmental consequences of mineral production that we haven't yet come to grips with.

That's a long way around from the National Academy of Sciences 3809 study, but I guess the point in that context is simply that the study bought us some time by pointing out that we don't really know, and that the BLM ought to put together a feedback loop, a method of consistently counting and reporting the successes and failures of the mines that they regulate. That buys the industry a window of opportunity to bring up to par those mines that are not meeting the expected standards, and yet I don't see any evidence that that's happening.

Swent: The accusation right now is that Congress is ignoring your report.

Krauss: Well, Congress is not ignoring the report. The accusation is that the Clinton administration ignored the report in issuing the revised regulations.

Congress wants to require that the regulations be issued in a way that only reflects the recommendations of the report. The regulations, as issued by the Clinton administration, would in no way resolve the problems that I see occurring on the landscape. They were just very politically- and not technically-based proposals. The essence of their effort is not to make mines that are environmentally responsible, but to deny them. So the Clinton proposal is really to give to the Bureau, to the Department of the Interior or the Bureau of Land Management, the discretion to say, "In our opinion, without any real technical basis, that the degradation resulting from this mine is unacceptable and therefore we will not allow it to go forward."

And talk about irreparable harm standard: what's irreparable harm to one person is environmental success to another, particularly when you get into some of these more cultural values of historic or Native American, not even physical artifacts, but rather the spiritual value of the landscape in its undisturbed condition. I'm sure that's true, and important, but I don't believe that it's true and important everywhere, and if you're going to grant that kind of authority, that kind of discretion, there needs to be some sort of checks and balance criteria, and it's not there.

The BLM still hasn't developed a way of keeping track of their successes and failures. None of the players have really come to grips with the real problems. The one issue on which there is now a consensus is that there should be full bonding, some sort of financial guarantee that will cover the total cost of reclaiming any mine, that's secure and sufficient. And that piece of the Clinton regulations, the Bush administration has reaffirmed, and the mining industry, most of the mining industry, has concurred in. That was one of our primary recommendations, that regardless of whatever other regulations you put on mining that there needs to be a secure, firm, adequate financial guarantee that the mine will get closed and cleaned up and reclaimed to some useful condition.

Swent: Even defining "reclaiming" can be, I suppose, a knotty problem, can't it?

Krauss: Well, it can be, but that's one of those things that's been batted around enough that there's pretty good case history. There's pretty broad consensus on that. There are those that still believe that reclamation should be restoration to pre-mine conditions, but when you move ten million, or a hundred million, or a billion tons of the landscape from point A to point B, you are not going to put it back into its pre-mine condition. Even if you make it the same shape, it's not going to be the same ecology, so it's kind of a moot issue.

California Mining Association

Swent: We're perhaps doing top-down here, instead of bottom-up, but we do need to talk about what you've done with the California Mining Association.

Krauss: Okay. We can probably do that chronologically. When we completed permitting at McLaughlin in '83 and '84 and construction and start up in '85, I had a little bit more time available to get re-involved in the state politics. I had served on the state Mining and Geology Board on behalf of Sonoma County in the seventies when I was their representative to the board as the public agency representative. I kind of lost track of the activities of the Mining and Geology Board. So as I had more time, I got back involved in attending their meetings and monitoring them and became involved in the California Mining Association as the association that was representing the entire industry in front of that board as well as other regulatory boards in the state legislature.

At that time, Homestake was heavily represented and heavily engaged in the California Mining Association. Denny Goldstein was participating and Dave Crouch was participating, and Bob Reveles was very, very active. It was kind of a resurrection in the late seventies of the old California Mine Operators Association that dates back to the 1870s, or 1880s. We had a picture on the wall at the CMA office that shows the members of the California Mine Operators Association standing on the state capitol steps in their bowler hats and their handlebar mustaches. But it was resurrected and it was under the leadership of an executive director who kind of felt he knew what was right for the industry.

Swent: Hunter?

Krauss: Ray Hunter, yes. So as I attended the Mining Board meetings, and became involved in talking to the legislators who represented the McLaughlin district, I began to discover that the executive director was presenting his view of what was in the industry's best interest without consulting with the industry. I would go in to see a legislator, and say, I'm here on behalf of Homestake and the McLaughlin Mine, and this is our point of view, and he would say, "Well, that's funny; I just heard from the industry--The Industry--and that's just opposite of what the industry told me." I said, "Well, who's the industry?"

Swent: What sorts of things were you discussing?

Krauss: Well, there were discussions on SMARA regulations; there were water quality regulations; there were hazardous waste regulations, air quality regulations. All of them were in play at that time, in the eighties, and all of them affected McLaughlin, and all of them affected mining.

Swent: How did your ideas differ from Ray's?

Krauss: Well, his view was very much the old fashioned "kill the bill." Somebody proposes regulation of any sort and if you don't like it, then you kill the bill; there's only one way to deal with that. That was the traditional way of dealing with it, that industry dealt with environmental regulations, and it worked fine for many, many years. You had an old boys' network, and you would go over to the Sutter Club, and you would talk to the author, and line up the votes, and kill the bill.

By the mid-eighties, the political dynamic was very, very different. We were dealing with a Democratic legislature and a Republican governor, both Dukmejian and Wilson, and neither of them were very interested in the mining industry. California politics was a little bit different than some of the other Western states. Even though California is the number-one producer of non-fuel mineral commodities in the U.S., as a percentage of the total California economy, it's a drop in the bucket; $3.8 billion is not much compared to electronics and trial lawyers and state employees and HMOs and medical insurers. Those are where the big, big bucks are and the big political games are played.

Neither governor would give us much; neither Republican governor, although you would expect them to, would give us much assistance, so we had to really deal with the legislature, which was a Democratic legislature. The old kill-the-bill approach to managing legislative affairs was no longer effective. Bob Reveles taught me that to be effective, you had to work both sides of the aisle. And that you had to understand what people's real concerns were and determine on a technical level whether or not they were valid, and try and find some responsible way of meeting those concerns that was not a burden or a hindrance to conducting business. Some of the concerns were not real, and we were able to persuade people that they could ignore them. Others were very, very real and we were able to negotiate legislative language that addressed the problem in a way that was acceptable to--

Swent: Could you give an example?

Krauss: Well, I think the biggest battle that I got engaged in was in the Surface Mining and Reclamation Act.

Swent: SMARA.

Krauss: SMARA, yes. There was an attempt in the late eighties by the Department of Conservation to persuade the legislature that the Surface Mining and Reclamation Act was not functioning, that it was not effective, it wasn't doing its job. They actually sent their staff around the state to take pictures and assemble what they called the May Day Report. How's that for an unbiased name? "The May Day Report on the Status of SMARA's Implementation." The May Day Report was basically an unauthorized, clandestine effort done internally by the Department of Conservation staff, and they concluded that only eleven percent of the mines in the state of California were in compliance with the reclamation law. When we asked for copies of the data on the basis of which they came to that conclusion, they refused to provide it, and ultimately denied that they ever had prepared the May Day Report, even though I have a copy of it.

But based on this May Day Report and the allegation that only eleven percent of the mines were in compliance, they wrote proposed legislation that would have completely revised the reclamation law, would have levied a severance tax on all mineral commodities, and would have preempted the authority of cities and counties to regulate mines and vested that authority in the state Department of Conservation and created a huge new bureaucracy at the expense of the industry.

They drafted this legislation; they gave it to Assemblyman Byron Sher, who was then chair of the Assembly Natural Resources Committee, and he did what I thought was a responsible thing. He said, "Well, if I'm going to carry this legislation on behalf of the Department of Conservation, I would kind of like to know what the industry thinks about it." His contact to the industry was through Rich Hammon. Richard Hammon was an attorney that had been deputy secretary of resources in the Jerry Brown administration, and Richard was then practicing law with Heller, Ehrmann, and Homestake was one of his clients. So Byron Sher called Richard Hammon and said, "Can you get Homestake to comment on this proposed legislation?"

Richard called Bob Reveles and Bob Reveles called me and we all got together. And oh my God, this is not the kind of bureaucracy that's going to make our lives any simpler, and it's not going to solve any real problems should they exist. It included a lot of language on reclamation as restoration, very, very rigid, and it was a SMACRA model, basically.

Swent: A what?

Krauss: Surface Mining and Reclamation Act. The federal Surface Mining and Reclamation Act, as it applies to coal, that was passed by Congress to regulate coal mining in the U.S., which is a totally different context. Even there, it's probably not a useful model, not a useful regulatory model, but it's certainly not a useful model for hardrock regulation.

We got engaged in the politics of fighting that battle, and it really turned--. At that point, I was involved in the California Mining Association, and the CMA took the lead and Homestake and Harry Conger and Jim Anderson held a meeting of all the CEOs of the mining companies in the state at Homestake headquarters in San Francisco. We discussed the proposed severance tax and this proposed new bureaucracy and regulatory scheme, and the industry joined together through the California Mining Association and agreed to fight it. So we entered into a long period of time where we were negotiating with the Sierra Club and with the Department of Conservation and with the rest of the mining industry. There was a woman by the name of Paula Carroll. Did we talk about this in an earlier interview?

Swent: No.

Krauss: We didn't. There was a woman by the name of Paula Carroll who was the legislative representative of the Sierra Club in Sacramento at the time. Byron Sher called Paula and me into his office at the same time and he said, "I do want to improve the Surface Mining and Reclamation Act and I'm willing to put into my bill only those things that the two of you can agree on." He said, "I want you guys to sit down and knock your heads together and see what you can do."

So we went through the law and we came up with four areas that we thought needed improvement, and one of them--it was "deja vu all over again"--the same issues came up in the 3809 regulation review ten years later. At that time the inspection of mines was optional, and we wanted to make it mandatory. The inventory of mines--there was no record of what mines existed, so the Department of Conservation could stand up and say they're only eleven percent in compliance, and nobody could contest it because there was no database. Nobody even knew how many mines there were in the state.

So we agreed that we would create a record-keeping system that would record on an annual basis what mines were there and which ones were active and keep track of the fact that they did, in fact, have the necessary permits and that each one would be inspected at least each a year. At that time, SMARA's financial guarantees were optional with the counties; they did not have to have a bond, so we agreed that we would make the bonding mandatory. And finally, we agreed that it would be useful if the counties and cities had some better enforcement authority. At that time, the only way to enforce against a non-complying mine was to ask the district attorney to go to court, and of course the district attorney, as an elected official, is much more interested in prosecuting murders and rapes and burglaries, and failure to reclaim is not high on his priority list, so we developed an administrative penalty procedure.

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Krauss: The last element of our SMARA reform was the administrative penalties, the enforcement authority, so we had a database, a recording of all the mines, mandatory annual inspection, mandatory financial assurances, and administrative penalties or enforcement authorities. Those were the four things that Paula and I could agree on.

My view was that those were simply the minimal requirements of a credible regulatory program, and it was in the industry's interests to have a credible program. How could we go to the public and say we wanted to put this mine into your backyard. They would turn around and say, "Well, but you don't get inspected and you don't have financial assurances and there's no way that I can be confident if I concur with the approval of your permits that it's not going to become a burden to me."

Of course, the Department of Conservation was livid because they didn't get their severance tax and they didn't get their new bureaucracy. But it was interesting, it went through both houses and off to the governor's desk for signature; it was Deukmejian at the time. The Department of Conservation recommended a veto, and their recommendation before it went to the governor had to go through the resources secretary, who was Gordon Van Vleck, and his deputy. Boy, I wish I could remember her name. She has since married an Australian outback rancher and disappeared from the landscape.

His deputy secretary of resources was the one that ultimately made the decision. We went in and we had a meeting: John Tooker was the California Mining Association's lobbyist; and Paula Carroll, from the Sierra Club; and then-director of the Department of Conservation, Randy Ward; and the deputy secretary of the resources agency. They sat around and she asked, "Paula, you mean you agree with the substance of this bill?" And she said yes. And she asked John Tooker, "And you agree?" And he said yes. And she turned to Randy Ward and said, "And you want me to veto this?" [laughs] She was flabbergasted and she denied his recommendation of veto and it got signed and it became the legislation.

It was a real education for me. I enjoyed every minute of that. That was in the trenches and Homestake actually paid the costs of hiring, it wasn't Richard Hammon, but one of his associates, Tom Donnelly, who did the technical drafting of the amendments to the legislation that was then introduced by Assemblyman Sher.

There were many, many, many hours of meetings and arguments and discussions and it got to be very acrimonious between the industry and the Department of Conservation. In addition to denying that the May Day report existed, they denied that they had ever authored the proposed legislation that Byron Sher gave me to review. I sat in Randy Ward's office in the resources building--Director of the Department of Conservation--with Richard Hammon, and we said, "We're here to discuss this legislative proposal that you submitted to Byron Sher." And he said, "We've never submitted any legislative proposal to Byron Sher." He said, "It's not our business to submit legislative proposals; we only react to them." And I was sitting there with the damn thing in my briefcase as he said those words. That was my indoctrination to the way politicians think.

Really, I mean, it's one thing to disagree with people. It's another thing to lie. It was a wake-up call in my dealings with that world. I had never encountered that before. Anyway, that was what I cut my teeth on in the California Mining Association. And then I continued to participate in the legislative committee and the environment committee and--

Swent: I'm trying to remember; I have it upstairs, a copy of a big thick report on the effectiveness of SMARA.

Krauss: That was done by a professor here at Berkeley. One of the provisions of the bill that we negotiated was that at the end of two years, or four years, I forget what it was, that there would be an independent study of the effectiveness of SMARA to decide whether or not the four amendments, the four substantive amendments, that had been made had been sufficient or whether there was reason for yet further amendments. That was the study you were thinking of; that was the outcome of that. That never had any consequence, either, although it was probably a pretty good report. It didn't say what the Department of Conservation wanted it to say, so they hired the report prepared and then they immediately buried it in their files, where it remains to this day. The regulatory world at the state and national levels is not very productive. There are real needs that could be served by people of good will. But at least at this point in our history, it's lost in--

Swent: Building up a bureaucracy?

Krauss: Well, that, and just personal politics. It's much more important whether it's my idea or your idea than it is, is it a good idea. I can remember legislative aides saying, "Hey, you know, we used your idea last time, it's their turn." I thought, Wait a minute, it doesn't matter whose it is; let's talk about the merits of it. I've always believed, and I've insisted as a member of the Mining and Geology Board, when we've engaged in rule making, that you put everybody's ideas out on the table, and you do it openly and publicly with full sunshine on the process and the ideas will float or sink, depending on their merit. It's only with our collective contributions that we even hope to come up with the best solutions to these problems, but it's not the way the system works, at least not now.

Swent: Are you still on the mining board?

Krauss: No. I left the mining board. I served my second term under Governor Wilson from--I'll have to check the years. But I left the board when I was laid off by Homestake and began my consultancy, because there are conflict of interest provisions that preclude you from representing mining companies before permitting agencies as a member of the board. So I terminated that relationship, much to my relief; it had gotten to be pretty frustrating.

Swent: But you did keep it while you were with Homestake.

Krauss: Yes, well, for a period of time. Not when I did the original permitting. I left the board when I did the permitting, and then I went back. And I only went back when, once I went back, there were people on my staff who actually stood up in public. The prohibition isn't that you prepare the documents or that you negotiate with people, but that you can't publicly represent the company in the public hearings. So Phil Barnes did that, or Dolora, or now, Dean Enderlin.

Swent: Then, of course, the Mining Association also got a new president and moved--its offices were in Jackson at one point; then it moved to Sacramento. It has changed a lot. It's quite a different organization.

Krauss: That whole process began, I guess, with the termination of Ray Hunter, and Bob Reveles was very instrumental in that. The rest of the members of the association began to experience the same problems that I had. I don't mean to be critical of Ray Hunter; it's just a change in style and a change in maturation of the association. There was a long period of time when the companies didn't really know what was in their best interest, and they relied upon him to know Sacramento and to know the ropes, and to use his judgment to best represent them, and that was entirely appropriate. It's just that circumstances had changed. We had more members; we needed a consensus of our members before we sent somebody out there to tell them what the industry's position was, and sometimes that consensus wasn't easily achieved.

Swent: I noticed in one of the recent publications here that you're now working toward a coalition with other associations.

Krauss: Well, we certainly are trying. That's a difficult one, too.

Why don't we just go through real quickly, chronologically, my activity with CMA. And then I can get that out of my mind. And again, I wish I knew the years. I would have to go back and date these, but I guess it was after the SMARA legislation, I became chairman of the CMA environment committee. That was also a real interesting experience because prior to that time, there had been one person who had chaired that committee for ten years. The meetings were ten or fifteen of us sitting around and he would bring us up to date on what the new regulatory issues were, and we would all take notes and go home. Again, it was very useful, and he, as an attorney, was up to date on most of the regulatory changes.

But it seemed to me, when I took over the chairmanship, that it didn't really engage the participation of many of our members, and so I reorganized the committee and made six subcommittees, and established a leadership of those committees that involved a mining company member as the chairman of the committee, and then an associate member of a legal firm as the legal chair of the committee, and an associate member, a technical consultant, as the technical lead of the committee. So we had an attorney and a scientist, or a technical person, and an operating company, that led each of the six committees, so now all of a sudden--

Swent: What were the six committees?

Krauss: There were Waste and Water, Fish and Wildlife, and Federal Lands and Permitting and Regulatory with SMARA, and Air Quality. That's five of the six. That was pretty good. There were a lot more. But all of a sudden we had eighteen people who were empowered to be leaders, and who reviewed legislative proposals and regulatory proposals. The lawyer and the technical and operating members would discuss among themselves what ought to be the association's position on that matter. They would bring it back to the full committee, and participation of the committee jumped from ten or twelve or fifteen to--we had as many as seventy people in some of our meetings. We had a huge amount of pro bono work from these technical consultants and lawyers; it gives them an opportunity to showcase their talents and their contributions in front of the full membership, and it just really blossomed. It's one of those things where you discover that it's not necessarily just a few leaders in an association that make a success out of it. If you can just create a structure that empowers people to participate, they're willing to do it, and no one person had to do so much work that it was a burden.

Swent: Is there that much new legislation and regulation coming out all the time?

Krauss: Absolutely. Absolutely. Every day.

Swent: On mining.

Krauss: On business in general and environmental issues in particular that affect mining. Water quality regulations. Air quality regulations. Land use regulations. Environmental review regulations. There are, I don't know, 4,000 new bills every year introduced into the legislature. And there's administrative rule-making going on all of the time.

Our sixth committee is the Abandoned Mine, Lands and Reclamation committee. Abandoned mines are a big issue in California. There's a real effort among some legislators and some environmental folks to pass the costs of reclaiming abandoned mines exclusively to the modern mining industry, even though the companies now mining in California had nothing to do with, any more to do with those than Ford Motor Company did, to create the abandoned mine in the first place.

There is a feeling that mining is mining. And old mines ought to be paid and cleaned up by current miners. That would be a huge, huge economic burden. In fact, it seems clear to me that it's a social--that we all benefitted from the products of those mines, whether they were reclaimed or not, and we ought to all share in their cleanup and reclamation.

But yes, there's plenty to do. From the environment committee, I was then elected as a second vice president and then a first vice president and then I just completed in May a two-year term as president of the association. And that's been a fun--I tried to build on the experience with the environment committee, use my presidency to find roles for other people to participate. An association like that has very little budget and very little staff, and the only way it can actually perform and become an effective advocate, which is what we are, an advocacy organization on behalf of the industry, is to create opportunities for its members to participate.

[Denise Jones is now the CMA executive director.[2] She is the perfect person for the job. She worked as the executive officer of the State Mining and Geology Board for several years when I was still a member so we had worked together quite a bit. Peter Steen [Homestake president] was on the CMA committee that selected her, and I think he was quite persuasive in her choice. She worked as an aide to Colorado Senator Armstrong in Washington for a number of years and is real savvy about the political process.

I've really enjoyed working with her during my term as CMA president. I think we're both similar in the way we work so it's been a good relationship. And she has really raised the level of professionalism of the group. And effectiveness. When anyone at the Capitol has a question about mining or mining-related legislation, they call Denise.]

Swent: Gold mining is not really a big part of the mining that goes on now in California.

Krauss: Well, less so. It certainly passed its peak. And there are, to my knowledge--

Swent: Most people immediately think gold when they think of California mining.

Krauss: Well, California is different from most of the states in the diversity of its mineral products, and the industrial minerals in particular. We have the only rare earths mine and hectorite, especially clays, soda ash, the biggest boron mine in the world. Gypsum.

Swent: Sand.

Krauss: Kitty litter. They're one of our more active--well, it's not "kitty litter." It's "cat box filler" now. "Kitty litter" is the wrong brand. It is a tremendously diverse and productive segment of our economy.

The other thing I should say about the California Mining Association is just that in addition to being an advocacy organization, it's the opportunity for like-minded folks to get together. There's just a tremendous amount of collegiality in that organization. I'm not sure why that is. Much more so than other groups and organizations that I've found, in that we're all kindred spirits.

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[2] The two bracketed paragraphs were added by Mr. Krauss during his review of the draft transcript.

Swent: It's kind of true of the mining people, don't you think?

Krauss: Yes, I think so. I'm not sure why that is.

Swent: I don't either.

Krauss: Maybe we all feel beleaguered and we get together; it's like a refuge. But it is a very, very--it's a great group of people. I particularly look forward to the times when we get together and have our meetings.

Swent: Well, I did see that you're hoping to form a coalition with the construction materials people and the rock products. It seems sort of logical.

Krauss: Yes. There are two other associations that represent all segments of the industry. I think California Mining Association represents more than 85 percent of the dollar value, anyway, of minerals produced, but the construction materials group includes the ready-mix cement, concrete people, and a lot of sand and gravel producers. And then the Southern California Rock Producers, it's a little different animal. They actually provide additional services than we do. They do collective labor negotiations on behalf of their association members and things like that.

But we are all engaged in Sacramento and lobbying on the same issues. and over the years we haven't always shared a common point of view, so in my term as president I initiated a coalition. We call it the Mining Association's Coalition and hold regular meetings to at least form a common position on those things that affected all of our members, not work at cross purposes. But like all of these things, there are personalities involved and turf involved. Ideally, in the best of all possible worlds, the three organizations would merge into one. We have everything to gain and nothing to lose except that the directors of the association--you don't need three directors; there would be one. And three lobbyists? You would only need one. So those kinds of--

Swent: There's some built-in recalcitrance there.

Krauss: Yes. And they feel pretty competitive about it. But I think to the extent that we can just leave it and agree to take the same positions, or remain neutral on those things that don't affect us if we don't agree with their position, it improves the circumstance. But it's going to be a long time before they ever combine.

The other thing that I started was negotiations with the California Manufacturers' Association to see if the California Mining Association might become an affiliate of what's now called the California Manufacturing and Technology Association, just because it would give us some efficiencies as far as administrative overhead and office space and copying and phones. They seem willing; we'll see how it progresses. I'm going to ask the new president to continue those discussions. But with the cyclical nature of mining and the mining economy and the booms and busts, it's really tough to predict whether or not the California Mining Association will have the revenue and the membership to continue at the same level.

Swent: Is it cyclical or just down?

Krauss: Oh, I think it's cyclical. It's only gold that's down, and gold isn't really down; it's the damn dollar [that] is up. If the dollar weren't so strong, we would get more dollars for each ounce of gold. But also there are certainly political and regulatory--at least perceived--political and regulatory and social obstacles in this country that have promoted mining's exodus. Who knows? It may be that we've just picked over the easy ones in this country and we'll have another cycle when the next round of technology comes out. I'm sure there are still a lot of elephants buried under the alluvia in these valleys in Nevada. It's very hard to find them now. We take the outcrops, we go and sample to drill. So maybe in another thirty years we'll have the next boom.

Swent: In California?

Krauss: California's a tough one because so much of the state has been taken out of access by the desert monuments. The most prospective mineral region of the world is now off limits to exploration, which seems a little short-sighted. Of course, what can be done can be undone. And one day we may find ourselves as a society in the position that--

Swent: We want those things again.

Krauss: We want them and need them and reach a consensus that those restrictions need to be adjusted.

Swent: Have you done any work in Nevada?

Krauss: Very little. I was involved in some discussions early on when Nevada first adopted its reclamation law. John Livermore had a nonprofit research group.

Swent: Public Resource Associates, it's called.

Krauss: Public Resources Associates, yes. And he held a number of seminars and gatherings of industry and environmental people to talk about reclamation and reclamation law, and to try and help promote a consensus on the Nevada reclamation law. I remember spending probably a good part of the day talking with the environmental community about the merits and costs of back-filling pits. That was an interesting discussion. But no, I haven't done any direct permitting or management of sites in Nevada.

Swent: They've been generally much more hospitable to mining, haven't they?

Krauss: Well, there have been some difficulties with permitting mines in Nevada as well. Certainly, there's a tendency to be, but even that balance is changing. Your political majority is urban, Las Vegas, Reno, Carson City, so the mining industry cannot throw their weight around to the same extent that they could ten years ago. And every new permit is subject to challenge and negotiation, so I don't think California is that peculiar. I think it's just perceived as being peculiar.

But if you look at--look at Montana. They passed an initiative prohibiting the use of cyanide. And Washington, the Crown Jewel--that's been battling and battling and battling. And Wisconsin, where Nicollet-Crandon mine has been in permitting for, I think there are probably three generations of consultants that have grown up and retired on that project. It's been twenty years that that's been in permitting. And there are new mines in California that are permitted every day for these construction materials, and sand and gravel, and industrial minerals, so I would not hesitate to recommend to a company that they undertake the permitting of a new mine in this state. I don't think it's any more difficult than anywhere else.

Swent: What about Lead [South Dakota]? Have you been involved there?

Krauss: Only peripherally. I spent a little bit of time four or five years ago looking at the potential closure of that site, and doing an inventory of all of the information that needed to be developed and the studies that needed to be performed in order to close the mine. Unfortunately, in contrast to McLaughlin, where closure was thought of from the very beginning, obviously that was not the case at Lead, so it was a game of catch-up. But when I went up there, it's probably been five or six years ago, we didn't even have a decent water balance for how much water came into the site and left the site, and we had no idea how long it would take for the mine to flood. We didn't know whether or not the tailing would turn acid and create acid leaching. We didn't know whether or not the pit walls would be stable. And we didn't know, really, we didn't have a good inventory of the activity locations that might be full of contaminants.

Swent: We should just say, for the record, there is both a pit and an underground mine there. So you've got both to consider.

Krauss: I think there has been quite a lot of work that has gone on on those issues. I turned over the work that I did to the current corporate group and they hired a raft of consultants. I think they have four people now doing that closure work in different capacities, so they're moving quickly to resolve those uncertainties.

Swent: But you haven't been really closely involved at all. And now it's being bought by Barrick.

Krauss: Yes. At least that's the proposal, and I presume it will pass the competitiveness test, the SEC review, and the Canadian equivalent, and stockholder approvals, and the merger should be complete at the end of the year.

Swent: Stockholders have to approve it, too.

Krauss: It seems unlikely that they would not. It certainly does create value in that regard. I think probably from a, well, Jack [Thompson], in his talk to the financial analysts, started out saying this is a bittersweet day for Homestake, with the termination of the name of the company which has quite a history and culture associated with it. But in his view, and I share his view, to combine the companies, the company created by the combination is a very special thing.

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Krauss: Jack said the combined companies are a special thing in terms of their geographic representation and the combination of their interests in Argentina but the aspect I found most interesting in talking to my colleagues in Homestake is that Barrick is very much a company of financial types, of bean counters. Most of their people have come up from the business side, from the finance side, investment side of mining, whereas Homestake has a lot of operating experience. Homestake personnel have a lot of operating experience, so that makes it an ideal combination as well, and I think the operators certainly believe that that provides them opportunity in the combined company. But it is a historic moment.

Swent: I think Homestake is California's oldest corporation.

Krauss: I don't know. It may well be. I think it has always been described as the longest continually traded stock on the New York Stock Exchange for a the company still in the same business. That's the longevity test that I've always heard.

Swent: So, in that sense, it's kind of the end of an era.

Krauss: But it has really been an end of an era for a long time. McLaughlin, really, was kind of the beginning of this transition. I think pre-McLaughlin we had Lead. And I guess under Paul Henshaw we began to diversify a little bit with the lead-zinc in Missouri and the uranium in Grants.

Swent: That was under Gustafson, actually, I think.

Krauss: Was it? And then along came McLaughlin, which really began to accelerate the growth of the company. When I joined Homestake in '81, our annual production total was three hundred, four hundred thousand ounces. And it's now over two million. So with McLaughlin and the Corona merger, and then the Plutonic acquisition, and then the Argentina gold acquisition, and now the Barrick merger, it's been a fairly steady progression. But I'd like to think it was McLaughlin that at least bought Corona.

Swent: Kept them alive.

Krauss: Paid the bills.

Swent: That's right. I'm sure you're right.

Krauss: So of course it was Grants that built McLaughlin. We had such lucrative uranium contracts for so many years that provided the capital, the income, financed McLaughlin to a large extent.

Swent: Have you ever had any input in Australia or Canada or Argentina? Any of the overseas operations?

Krauss: Just very peripherally. I did visit Kalgoorlie. I gave a paper in Darwin a number of years ago, and attached to that trip was a tour of other mines in Australia. I did visit Kalgoorlie at that time, and looked at those operations and talked to their environmental manager for a couple of days. Similarly, when Jack was in Vancouver, he asked me to come up and talk to their people about the permitting on Eskay Creek. I certainly didn't contribute anything to their successes; they did a good job on their own.

Swent: Were the environmental problems, or challenges, about the same there as they would be in other countries?

Homestake Mining Company final shareholders' meeting, Walnut Creek Marriott, December 14, 2001.

Jack E. Thompson, Chairman.

Homestake Mining Company final shareholders' meeting, Walnut Creek Marriott, December 14, 2001.

Wayne Kirk, Counsel; Walter Segsworth, President.

Homestake Mining Company final shareholders' meeting, Walnut Creek Marriott, December 14, 2001.

L-R: Steven Orr, President, Homestake Canada; Harry M. Conger, retired Chairman; William Humphrey, retired Vice Chairman.

Homestake Mining Company final shareholders' meeting, Walnut Creek Marriott, December 14, 2001.

L-R: Patrick Purtell, John Mack, Mary Terou, Kent Billhartz, Dean Williams, Eleanor Swent, Dean Enderlin.

Homestake Mining Company final shareholders' meeting, Walnut Creek Marriott, December 14, 2001.

Representative of auditing company reading results of shareholders' vote which merges Homestake Mining Company with Barrick Gold.

Krauss: Oh, I think so. At Eskay Creek they had native corporations, three different native corporations to deal with. They're working in an arctic area with forty feet of snow, or sixty feet of snow, every year, and have tailings containment and disposal issues. Permitting and public relations issues and governmental affairs issues are really very similar. It don't think anywhere in the world, it's much different any more.

Swent: What was it you said? It all comes down to two words? What was it?

Krauss: Containment and reclamation. Yes. In its simplest form, sound environmental management: contain it on the site, reclaim it when you're done.

Swent: And get the local people to let you in.

Krauss: Well, then there's that. Then the list begins to get longer and longer and longer and longer. But those are two real--that evolved out of a discussion with the media, trying to explain to them what responsible mining was in words that they could get into a sound byte. We finally boiled it down to two words. But it expands quickly.

Swent: Well, let's look at our list here and see.

Krauss: Do you think we've exhausted this topic? After sixteen tapes, I would certainly hope so.

BLM National Science Advisory Board

Swent: We did talk about the National Academy of Sciences, didn't we? The research council was the extent of your involvement there. And then the BLM National Science Advisory Board.

Krauss: That's an assignment that Jack has given me in the last couple of years.

Swent: That's a new one.

Krauss: Yes. And that has been a very interesting one as well. Under the last administration, the Bureau of Land Management decided that they wanted a science advisory board of their own and Jack was appointed to be a member representing industry and kind of a token industry representative, and because he was busy or had conflicts frequently, he asked me to be his alternate.

The one project that we did complete that I thought was useful was developing what we called a science strategy for the Bureau of Land Management. There's been a lot of accusations leveled that land management decisions made not just by BLM but other agencies don't always reflect good science, so the challenge was to come up with a strategy or a procedure that would bring appropriate good science to bear. "Good" in quotes. Good science to bear on management decisions. It's not an easy thing because often good science requires quite a little bit of lead time in advance of its use in support and illumination of management decisions.

We developed, I thought, certainly along with the BLM staff, a strategy where, on an annual basis, they look at their strategic plan and try to identify those management decisions that are upcoming in the future and consult with their field staff and their regional and state folks and determine what are those long-term issues on which you need science support and compile it all into kind of an annual catalogue of science needs that can then be shared with other agencies.

BLM does not have its own internal scientists any more, its own science support. Many of its land managers are, in fact, scientists, but they don't have a research arm. That's all stripped out of the agency and put into the U.S. Geological Survey, so they have to depend on the USGS or the academic community or others to do the basic research and the applied research that's useful to them in support of their management decisions.

Swent: There was this big push a few years ago to do away with USGS.

Krauss: Yes.

Swent: That would have impacted this whole thing then, too.

Krauss: That would impact an awful lot of agencies. It would impact Forest Service and its management of the national forests, and Park Service.

Swent: It quieted down. I don't know how it happened, but for some reason it all went away.

Krauss: USGS is kind of a different animal than it was a few years ago, too. Because Babbitt took all of the biologists out of BLM and Park Service and he was going to create the National Biologic Survey, the U.S. Biologic Survey, in parallel to the U.S. Geologic Survey. Then Congress refused to fund it, so he kind of merged all those people into the USGS, so that has been kind of de facto, at least in the Department of the Interior, the science arm of the Department of the Interior.

Swent: Isn't the National Academy of Sciences also supposed to be advisory?

Krauss: That's very different. They don't undertake any research. The National Academy of Sciences basically reviews all of the information on a particular issue and describes whatever conclusions can be drawn from the existing information.

Swent: But they couldn't advise BLM, for example?

Krauss: Well, the work that USGS does is actually going out and conducting new scientific studies. They did, for example, in the Carlin Trend they created a hydrologic model of the Humboldt River basin to try and evaluate the consequences of all the dewatering of the mines in the Carlin Trend. And they deal with experimental approaches to managing the land. Another example that they struggle with all the time are the wild horse and burro populations on public lands. If you look at the population projections, their numbers are increasing so rapidly that it's almost impossible to control them, and of course there's a public sentiment that they shouldn't be turned into dog food. They're trying to run this adoption program, and if you look at the costs and the numbers that can be removed from the range on an annual basis through the adoption program, it's not sufficient. They're looking now for some sort of a contraceptive inoculation that they can use to control those populations. So they go out and get scientists who are doing that kind of work.

Swent: Is this the sort of thing that you get involved in on this advisory committee?

Krauss: Well, the strategy provides a mechanism for early identification of those needs and publicity of those needs so that if you're working at UC Berkeley in the field of animal science, you can look at the BLM science catalogue and you can say, Gee, here's some work that I could do that would fill a need. And presumably, because it's work that would fulfill a need, then funding agencies, National Science Foundation and others, might be more likely to fund that proposal than some other proposal.

Swent: So that's the sort of thing that you come up with.

Krauss: That's what the strategy is about. It's just a procedure, a mechanism for trying to identify and catalogue and communicate the needs in a way that allows that information, that science, to be provided in time to actually be used in these decisions. Most often there's not the appropriate or the necessary science information available to make land management--land management decisions are very, very complex. The ecological systems are very, very complex. And historically, most of the decisions we've made have been pretty disastrous.

One of the issues we were looking at on the Science Advisory Board was the Great Basin where, for years, the approach was to exterminate the sagebrush and plant more grasses for grazing, improve the quality of the pasture for grazing so we could support more cattle. So the bulk of the natural environment has been destroyed, and now all of a sudden the Rare and Endangered Species Act says that the sage grouse is likely to be listed because its habitat has been eliminated. Now we're saying, Well, gee, how can we restore the--the BLM has started a Great Basin Restoration Initiative. How do we restore the Great Basin and its natural sagebrush habitat? And how do we get rid of the cheat grass and how do we get rid of the other exotics that are now dominant species? And what's the role of fire in that process?

These are very, very, very complicated scientific issues, ecological issues. There's need to do an awful lot of research before these decisions can be made appropriately. So the strategy is really to try and identify those kinds of long-term questions that need to be studied, and then let the academic community and the USGS and others know that these are areas where research would be useful. It's interesting.

Swent: I would guess that you're really enjoying that, aren't you?

Krauss: Oh, yes.

Swent: That would be right up your alley, wouldn't it?

Krauss: The mining work is just an adjunct to the bigger picture of resource management. How do we manage large scale landscapes in a productive way that serves human needs and preserves natural values? And where lies that balance? That's the fundamental curiosity that I live with all the time.

Swent: So you're getting a chance really to use all of your different ideas now.

Krauss: In different contexts, yes. The work that I do now as a consultant is expanding a bit so that I'm getting exposure to broader opportunities than simply mining.

Swent: Shall we go and take our lunch break now?

[tape interruption]

Swent: I hope that we've done justice to McLaughlin. I think we have.

Krauss: Oh, I'm sure we have. With all of the yammering I've done and the tapes that you've accumulated, I think we've more than covered it.

Swent: I wanted to do two things. I wanted you to talk about these other things that you, personally, are going on to be involved in because I think that it is certainly as a result of, or an outgrowth of your activities at McLaughlin that you're doing them. And then also a little bit of philosophical wrapping up about McLaughlin. It has been significant, both in your life and in the mining industry, what you've done.

Krauss: Well, I can speak to the former. I don't know about the latter. I guess in terms of other things that I'm doing, progressing into, the two that come to mind are building on the Blue Ridge-Berryessa Conservation Partnership.

Blue Ridge-Berryessa Conservation Partnership Proceeds

Swent: Where does that stand now?

Krauss: It's still proceeding. We've just received word from the Packard Foundation that they want to fund our planning grant. We'll be meeting with them next week, actually, to begin to hammer out the details of that. We'll be developing what we're calling a conservation framework that describes the common conservation elements of the whole region. We'll talk about the sensitive habitats, the protective elements: what are those elements that need to be protected, and additional properties acquired, and additional conservation easements acquired? We'll talk about stewardship elements: what are those activities that can be undertaken collectively that will restore and enhance the habitats, removing exotic species and bringing back more natural landscape?

Then the third set of elements are those that deal with the distribution of human uses in the area. Where can we develop more regional trail systems and visitors' facilities and interpretive and educational facilities? Hopefully the framework will involve all of the partners' properties so that we can have an integrated and coherent conservation effort over the whole--it's almost 600,000 acres now. It keeps growing.

Swent: Who is going to administer this whole thing?

Krauss: Well, the framework will be developed by the partnership. The implementation of the framework will be undertaken by the partners themselves, so BLM will draw from the framework those portions that are relevant to the properties they manage, and Bureau of Reclamation similarly, and private owners similarly. Hopefully, it's a mechanism for coordinating the management and stewardship of the region without actually having to consolidate it under a single administration. It's an interesting way of--

Swent: Has this been done any other place?

Krauss: Oh, I'm sure somebody has done it; I don't think it's that unique, but I haven't gone around and looked for other models.

Swent: And your role in this? You're chairman?

Krauss: I'm still the facilitator of the group. But it's a model, it's a partnership model that I think has application elsewhere. And I've begun discussions with folks in Sonoma County to see if we couldn't develop a smaller partnership, a Mayacamas Mountain partnership that would involve the Geysers area and the Mayacamas chain down through east of Santa Rosa, almost down to Sonoma. That's basically the next chain of mountains in the coastal range west of the Blue Ridge-Berryessa Natural Area.

Swent: And this would involve BLM also?

Krauss: Some BLM. More private owners. Major industrial groups would be the Geysers geothermal operators, Calpine. There's a Sonoma County Open Space District, Ag Preservation and Open Space District. There are quite a number of--the state park property, there's the Robert Louis Stevenson State Park. And other park units.

Swent: There's a big quarry up there. Is that in that?

Krauss: Oh, Mark West Quarry? It's probably in there, but it's not really that large, a local quarry, basically. It's not a big industry. And then there are other opportunities to do that same sort of a partnership model. I've been invited to look at the opportunity to do something similar in the central coast of California with the--Unocal has Guadalupe Dunes, and Avilar Pier, and of course there's the PG&E Diablo Canyon properties, and the little town of Cambria has a newly acquired property. There's a bunch of publicly owned coastal properties and privately owned coastal properties that are being managed independently. There's some interest in developing a common vision for the stewardship of that area. I don't know if anything will come of it. But yes, I think the Blue Ridge model is one that would apply to that sort of coordinating effort.

Swent: Get the public and private groups together.

Delta Tributaries Mercury Council

Krauss: Yes. And then the other area that I've been working on, it's kind of a public policy area, the Sacramento River Watershed Project and Cal-Fed are involved in looking at mercury contamination.

Swent: Who is Cal-Fed? What's that?

Krauss: It's the state/federal partnership that's looking at revising the management of the federal water project and the state water project and, in turn, benefitting the ecology of the Bay Delta. So it's primarily federally funded. It's a whole new agency and another bureaucracy with lots of money to spend. And just one component of what they're doing is looking at water quality as it affects the Bay Delta and particularly the mercury accumulation and the fish in the bay and the delta.

Swent: What did you call it?

Krauss: This is the Delta Tributaries Mercury Council.

Swent: And you're a member of that?

Krauss: I've represented Homestake on that for a number of years. And then more recently been hired independently to provide them technical help on trying to identify sources of mercury and what, if any, control measures might be effective when applied that would ultimately reduce the mercury in the fish in the bay and delta.

Swent: Would you like to repeat what you said earlier, I thought it was interesting, about the mercury from the mines?

Krauss: Well, it's a very complicated issue, a very complicated science. And there's global background mercury in the atmosphere that falls with precipitation. And there's naturally occurring mercury in various forms that occurs in the Coast Range geology. And there's an awful lot of mined mercury that was hauled up into the Mother Lode. And all of this in combination cycles through the watershed and is acted upon in various habitats by bacteria that methylate the mercury and make it available for uptake into the food chain.

So it's not a simple equation. It's not a matter of identifying any source of contamination and picking it up and burying it somewhere and solving the problem. It's a much, much more complicated issue than that and I'm not sure that there is a rational cleanup approach that will, ultimately, make any difference. There are places in North America where the mercury in fish flesh levels are just as high as they are in this region, or higher, and there's no proximal geologic or industrial source. So just the atmospheric contribution is enough to push them over that threshold. But it's a real interesting challenge. It's interesting information to try and sort through.

Swent: And it's where a scientist needs to be involved.

Krauss: A lot of scientists. Again, my role is not so much as a scientist as an integrator of the science done by others, trying to provide some sort of structure that you can use to identify what questions need to be asked and what answers need to be applied before you can rationally think that spending money is going to ultimately make a bit of difference. We spend a lot of money that doesn't make a bit of difference, and we're good at that. But it would be nice, once in a while, to spend some money that does make a bit of difference in the world of environmental cleanup.

Swent: Who supports these kinds of things?

Krauss: Cal-Fed is state and federally funded.

Swent: Then they pay you as a consultant?

Krauss: I'm a consultant. I have a contract with, actually, I have a subcontract with the contractor that has a major contract with the Cal-Fed program. And I still have to find a client for the Sonoma County partnership. I think I'm going to see what I can do in that area because it's an area that has personally interested me because I live there. And I worked there extensively, in that area, when I worked for Sonoma County, so I've maintained an interest in that area.

Swent: Speaking of your living there, I think one point that we perhaps did not do justice to is Barbara's farm? I shouldn't say Barbara's, it's yours, too.

Krauss: Oh, it's hers.

Swent: Is it hers? Okay.

Krauss: Definitely.

Swent: I don't think we really got into that at all.

Krauss: When we started living there, we built the house in the seventies, we had imagined becoming self sufficient. And we developed an extensive garden and four or five acres of orchard. It was probably five acres of orchard and a couple of acres of garden. And had farm animals, goats and geese and chickens and rabbits and cattle. And not only did we--well, I don't think it was ever truly self-sufficient, because we had a lot of outside inputs. But we certainly produced a huge amount of food.

Swent: And did you build your house largely yourself?

Krauss: Yes. Yes, I did that while I was working at Sonoma County and hammering on weekends. And lived in its partially completed state while we continued to work on it.

Swent: It's a beautiful house.

Krauss: But with all of the extra food, Barbara started going to the local farmers' markets, and has developed that into a business of her own. And not only has been engaged in producing and selling garden and orchard products, but she also served as a member of, and president, of the board of the Marin County Farmers' Market Association. And spent quite a lot of time working--

Swent: Marin County, not Sonoma County.

Krauss: No, Marin County. Yes. She has been selling both in Marin County and in Sonoma County. And occasionally in Napa County, over the years. But it's a nice balance to all the word crafting that I end up doing. It's a physical reality that you can see, and it's tangible. Pumps break and gates fall down and they need to be fixed.

Swent: And do you still have all those animals?

Krauss: No, we got rid of the animals years ago.

Swent: Other than the dogs.

Krauss: Yes. That was just way out of proportion to what we needed or what we could do. But that's part of the learning experience.

Swent: Well, this goes back to the generation you belong to. The sixties kind of thing was to go off and be self-sufficient.

Krauss: Well, there was a sense when the seventies gasoline crisis hit that maybe one day you would go to the supermarket and they wouldn't have dinner. And that would be a circumstance one would want to avoid. But it was fairly naive.

Swent: Romantic.

Krauss: Yes, romantic proposition. It's not unique to the sixties. Much of Sonoma County--

Swent: Great American tradition.

Krauss: Yes, much of Sonoma County was settled by utopian communities at the end of the last century, the eighteen hundreds, nineteenth century.

Swent: Did you do this with others? Was there a group that you were--

Krauss: There were people that we had talked to about it, but we were never able to sustain a group. And I was too impatient. I said, I don't want to wait around for the group. I want to go do it. We actually had partners when we first acquired the land, and they got cold feet.

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Swent: What about your helpers? You have mostly Mexican helpers?

Krauss: We have over the years. Yes.

Swent: How has that worked?

Krauss: Quite well. We've had a relationship with a Mexican family who have over the years, various siblings have come and worked with us for periods of time. Wonderful family, very industrious.

Swent: Are they resident here?

Krauss: They're resident here, yes.

Swent: I shouldn't say Mexican, then. I guess they're really American.

Krauss: Well, they're in transition. It's a family in transition. At least one of them is now a naturalized citizen, and the others are contemplating that. But you certainly couldn't do that kind of work alone. Barbara has had as many as three or four full time employees at various times of the year. We've kind of settled back to a more leisurely pace with one full time employee. Barbara does the marketing. She enjoys going to market and dealing with the customers, being engaged in the social end of the business.

Swent: Do you know where they're from in Mexico?

Krauss: No. Barbara does. It's her business. No, in fact, I should know. They invited me to go visit for--the workers' daughter had her fifteenth birthday.

Swent: That's a big event.

Krauss: And they went back to their village where their grandparents lived and had the party there, sent us this elaborate invitation to come to it, but we weren't able to.

Swent: Did you build your office building yourself?

Krauss: I designed it. I had contractors build it.

Swent: That's quite a different structure, isn't it? More modern.

Krauss: Oh, I don't know. It's the same design. It's pretty much--it has sheetrock instead of knotty pine.

Swent: I guess that's the difference.

Krauss: But no, it's post and beam. It's the same exterior siding. Pretty much the same roof, the angles.

Swent: When did you build that?

Krauss: Well, I built the building, I don't know, about ten years ago. As McLaughlin began to wind down, I finished off the office. I saw the handwriting on the wall, so I had an office to move into.

Swent: It's much more high-tech than the rest of your place seems to be.

Krauss: Well, it's got a couple of computers in it.

Swent: Yes. I guess that's why I think it's--

Krauss: Yes. It's sheetrock and computers rather than knotty pine, but that's about the only difference.

Swent: So it keeps you plugged in with the rest of the world very nicely.

Krauss: Well, with today's technology, it's very easy to get e-mail and fax and phones and work anywhere.

Swent: I have been talking to Doug Halbe. Do you know Doug?

Krauss: The name's familiar.

Swent: He did some of the metallurgical work for McLaughlin, then he left Homestake, went to Australia with another company.

Krauss: Yes, I know the name but I don't think I ever worked with him.

Swent: He was with Homestake a long time ago; he's in Salt Lake now. I was talking to him a year or so ago, and he mentioned that there were five significant events in the late twentieth century in mining, and I thought, it occurred to me, that a couple of them were really definitely connected with the work you've been doing. One was use of LHDs, the load haul dumptrucks, which Homestake, of course, didn't need at McLaughlin.

Krauss: Right.

Swent: And the SXEW, solvent extraction electro-winning, for copper, which Homestake has not gotten involved in. And then the activated carbon-based technology for gold.

Krauss: That was something that Homestake pioneered at Lead, not at McLaughlin, but we did use it at McLaughlin, but it was pioneered at Lead many years ago.

Swent: They used it at McLaughlin, along with the autoclave technology. And then the biological methods for recovery, and at least one of those was also pioneered at Lead. The *pseudomonas paucimobilis mudlock*--

Krauss: Yes, that was in their water treatment plant. Yes, right. I just saw Terry recently.

Swent: Terry Mudder developed that at Lead.

Krauss: Terry Mudder and Jim Whitlock.

Swent: Oh, that's it. Mudder and Whitlock. But they named it Mudlock.

Krauss: Right.

Swent: And that, of course, had been developed before you came in.

Krauss: Yes. That was a bacteria that metabolizes cyanide compounds that was used in the treatment of the discharge water at Lead. And that was a technology that was developed by those guys at Homestake in Lead.

Swent: Did you use that at McLaughlin at all?

Krauss: No. We looked at it, but it didn't lend itself to our circuit, because we had no discharge to the environment. Everything was contained and evaporated on site.

Swent: So you didn't need to do that.

Krauss: No. It wasn't required.

Swent: And the thiobacillus ferro-oxidans you didn't need to do--

Krauss: Well, we did.

Swent: You do have iron, don't you?

Krauss: We did. We did. That played in two regards. In the waste dumps, we tried to prevent it. That's the bacteria that promotes acid sulfide oxidation and acid formation. The metallurgical group did quite a bit of work on those bugs at McLaughlin. And I think Homestake actually acquired a property or two in that period of time where they looked at using biological oxidation to liberate the gold in lieu of pressure oxidation, autoclaving.

And certainly McLaughlin's processing of the low-grade ore benefitted from the presence of those bacteria. And we did everything we could to promote their activity in the stockpiles so that there was quite a lot of oxidation that went on in the low-grade stockpiles between the time the material was placed in the pile, and the time it was reclaimed for processing. And in fact our recoveries increased from around 40 percent for freshly mined material, to 60 or 65 percent for stockpiled material.

Swent: I hadn't realized that had anything to do with any bacillus.

Krauss: Oh, yes.

Swent: I just thought it was chemical oxidation.

Krauss: That's a natural bacteria. That's not an engineered bacteria. That's a naturally occurring bacteria. It's everywhere. So generally what people try to do is either create an environment where they enhance its activities, make it more favorable, or if you're trying to prevent acid rock drainage, you want to make an environment where it's less hospitable. And we did both in different circumstances at McLaughlin.

Swent: Well, that's a whole new way of analyzing.

Krauss: Yes, and it's not really recovery. I mean, you're not really recovering--I think that technology is there somewhere, and I used to joke with Terry Mudder about it. When they developed the Mudlock bacteria that metabolizes cyanide, and I'm not an expert in this, but it seemed to me that they concluded that there was actually some uptake of gold across the cell membrane in the course of metabolizing they take in the cyanide-gold complex and then metabolize the cyanide and there would be some residual gold molecules within their cell membranes. And if you ash the bacteria, then you could recover the gold.

Swent: A hundred percent recovery!

Krauss: So what we said was that what we needed to do was breed bio-retrievers, that the next generation in mining would be bacteria that we would inject into an ore body and it would consume the mineral values and return to the surface. And we would call them bio-retrievers. Now that would be bacterial recovery. To my knowledge, that hasn't yet been done.

Swent: Well, I've heard that they're experimenting with something like this in Chile.

Krauss: Maybe. I'm not familiar with it. Quite an advancement. But the McLaughlin technical advancement, of course, was the first use of autoclaves.

Swent: The continuous autoclave.

Krauss: Yes. And on gold ore. Continuous autoclaves had been used on uranium and nickel but not on gold ore. But obviously that's a metallurgist's view of mining.

Swent: Well, then, the fifth big thing that he thought was significant was the tailings disposal. And I suppose he meant the revolution in--

Krauss: You think containing it instead of putting it in the local river?

Swent: I imagine that's what he meant.

Krauss: I would hope that's not viewed as being revolutionary, though apparently it is.

Swent: Until recently it wasn't even thought of as an item, I guess. It was just, you washed them down the creek and that was that, most places. And you don't do that any more.

Krauss: That hardly strikes me as being revolutionary. That's been decades since--I mean, Homestake fought and squabbled over that, and even they installed Grizzly Gulch [containment] in the seventies? The sixties?

Swent: Well, the thirties is when they had the big court suit about it.

Krauss: On the Belle Fourche? Yes.

Swent: I think awareness of the importance of tailings disposal probably is the new thing. Or containment.

Krauss: That surprises me that anyone would see that as a new thing. That's 50 percent of my responsible environmental management, is containment. Not reclamation. And the idea that one could turn loose one's waste in an untreated form onto his neighbor's property, is pretty primitive.

Swent: It was done. It was done.

Krauss: Oh, it was done. But to think that the transition from that state of mind to the current state of mind was--it's certainly not a recent revolution, put it that way.

Swent: Well, I suppose in terms of hundreds of years of washing it down the river, and fifty years now of containing it, it is a change. And a cost that people hadn't thought of before.

Krauss: No. And it's not as if mining were out of step with the rest of society. Those same advances in management of wastes occurred in human waste. Every city was located on a river, and you dumped its sewage raw, untreated, into the river. And the Clean Water Act was only 1960s. So not yet fifty years old.

Swent: And somebody was telling me, just the other day, I hadn't heard this before. Some of the place names in Napa County reflect the fact that the ranchers used to slaughter their cows there and keep the hides and send the carcasses down the river.

Krauss: The Spanish certainly did, yes. That was a hide business, it wasn't a beef business.

Swent: Carneros. I think that's why they named carneros.

Krauss: And some of the early industries of Napa, along the Napa River, were tanneries. And all of the tannery wastes went into the river. So these are all societal changes. Not a single industry.

Swent: Not just mining.

Krauss: Not just mining. It's hardly revolutionary.

Mining and Sustainable Development: Not an Oxymoron

Swent: No, I guess not. Did you want to talk about sustainable development? You had actually talked about that a little bit earlier, but I didn't know whether you had any more to say about this; is it an oxymoron?

Krauss: Well, I don't think it is an oxymoron. I think that mining and sustainable development go hand in glove. Mining is the source of the stuff that creates sustainable development. It's not a mystery. I'm going up to Vancouver next week, this weekend, actually, to a Global Mining Initiative, Minerals for Mining and Sustainable Development. I'm on the review committee. And they're trying to come up with some sorts of universally applicable principles that should be applied on all mines around the world that promote sustainable development.

But mining and sustainability are only an oxymoron if you don't look at the bigger system. If you look at it in isolation from the rest of the activities that it's engaged in and that it fosters. And both in terms of the use of stuff that we produce and also in the case of the skills and infrastructure and other things that we create in the context of establishing a new mine. The only way mining is not sustainable is if we ignore its future, ignore its legacy.

Swent: Which you've worked so hard on.

Krauss: Well, that's certainly part of the McLaughlin model, that you don't just develop the stuff, but you look at the consequences of the process and its implications for the future. And I think that's even more relevant in developing economies and more important in developing economies because the needs are so much greater.

Swent: In what we used to call the Third World. I guess that's out of fashion now, to use that term. But some of the mining companies left legacies of a culture that was very different.

Krauss: Yes, well, or the only legacy that they left was contamination and pollution. Without any cultural or social benefit.

Swent: They also left education and highways.

Krauss: Well, I would hope so. That's the potential. I've listened many, many times to General [Richard] Lawson when he was president of the National Mining Association saying that mining is the key to the future in developing nations. And certainly it can be. The development of those resources and the construction of the infrastructure, and the trainings and skills and education and health care that comes along with it, can become the cornerstone of a new and modern economy. But only if there's some vision of doing so, and some commitment to implementing that vision, and that certainly wasn't always the vision. There are too many examples around the world where it wasn't. Mine the material and ship it back to the mother country and come home, and not worry about the legacy or the consequence.

Swent: McLaughlin had an impact on the culture of Lower Lake.

Krauss: Oh, yes, but we were also mindful of what that culture was, and not disdainful of it. Before we were there we went to find out what that culture was and what were their cultural needs and wants and desires. They wanted help with their water system; we provided help with their water system. They wanted support for the education to the extent that we would impact it, and there was a lot of communication about that.

Now when I talk about the disdain for the culture, I think that there are circumstances in developing economies where we just presume that what we have is superior to what was there, and what was there is not worth preserving. And that may ultimately be true; I don't know, but you can't just assume that it's true. And you certainly need to leave the local citizenry the opportunity to remain attached to their "culture." Their traditional ways, their historic ways. In the best of all possible worlds, they would integrate their cultural traditions into the operation of a mine. And I think there are places where that has been done.

I don't know the name of the mine, but there was a presentation, there was a BHP diamond mine in northern Canada where they worked extensively with the native--the First Nations, they call them up there. In developing a partnership with the first nation peoples and the development of the mine. And not just displacing that culture but rather understanding it and accepting it and integrating it into the new vision.

Again, it's not rocket science. It's the same kind of--it's like going out and asking the Sierra Club, what do you think? Instead of saying don't get in my way, we're going to do it our way and we'll bowl you over, don't worry.

Swent: But it is a new and different way of doing it for most enterprises.

Krauss: That's certainly my impression.

Swent: BHP has been quite good about that.

Krauss: Well, I think all the major companies are more mindful of that; we're all evolving rapidly and we're all learning from each other. That's one of the benefits of these conferences, to hear these stories.

Swent: Well, the conference that you just mentioned, I saw a notice of it, too.

Krauss: No, I think the one where I heard the discussion of BHP was last year's Northwest Mining Association's annual meeting in Spokane. Their keynote was on mining and sustainability. And they had invited a number of company representatives to provide what they called case studies of how they viewed promoting sustainability in their company and in their operations, so that was one of them.

Swent: Were you a presenter?

Krauss: No. I just listened.

Swent: But this new group that you mentioned is an international consortium of some kind?

Krauss: Yes, a bunch of big companies got together. Homestake wasn't--Jack decided not to participate, and created what they called the Global Mining Initiative and tried to develop principles of sustainability that can be universally applied. Like everything, however, it's not black and white. Certainly it has some merit. To some extent, it's reinventing the wheel. There are a bunch of people in various academic communities that we communicate with that were annoyed by this effort because they were not included. And it has been their academic specialty for all their careers. And their view is that this is reinventing the wheel. They're redoing everything that their graduate students have done previously. I don't know. It's very hard for the mining industry to collaborate and speak with one voice. I don't know why.

Swent: Well, of course, the mining industry in this country is getting smaller and smaller. With the consolidation of companies. There are only about three left now.

Krauss: There are more than that.

Swent: The big ones.

Krauss: Again, the tendency is to look at copper and gold, and characterize that as the mining industry.

Swent: Within the last two years, there have been a lot of consolidations among the big ones.

Krauss: But there's a whole lot of other mining that goes on, too, that's not copper and gold that's just as significant to sustainability.

Swent: But the companies are small.

Krauss: Even there, there's some consolidation. Vulcan Minerals has bought a number of West Coast aggregate producers over the last couple of years. So there's some consolidation there, too. But yes, there are a lot of small mining companies around still. Not so much in gold but in other commodities.

Swent: I was just up in Montana. And when you think of the kind of power that Anaconda had a hundred years ago, there's nothing like that now.

Krauss: Oh, yes. True.

Swent: They ran the nation.

Krauss: Well, look at Silver Valley in Idaho. All shut down. And Colorado.

Swent: They told Congress what to do, really.

Krauss: Right.

Swent: Quite literally. Because they could go to Washington and decide things. And they don't any more.

Krauss: Spoiled us.

Swent: It's a whole different ball game. Do you think you made an impact--do you think mining people really are sincere now about care for the environmental?

Krauss: Well, I don't think you ever make waves. I think you ride waves. And I made an example of something that was inevitable. If I hadn't done it, somebody would have done it in the same time frame. I don't think I persuaded anybody to do anything differently. You know, I think everybody sees the handwriting on the wall.

And there are lots of people who are more talented than I that do the same kind of work that have come up with these same concepts. I see them at all the conferences. Joe Danny and Jerry Danny, the Danny brothers. And Bob Meshak and there are dozens of environmental managers in the business, and when we have a conversation, we all are of a like mind on these things. So I think that business and social and cultural factors converged to make a McLaughlin necessary, and I just happened to be at the right place at the right time to give voice to it. And enjoy every minute and learn from it.

Swent: You were a little bit ahead of the curve.

Krauss: Well, I pushed them a little bit. But the context was there. The contextual reality was there. I didn't create that. But I pushed people's credibility along the way. But there are always people--

Jack didn't have any trouble seeing the merits of this approach, where some of the construction folks thought it was outrageous. So you have the whole spectrum of points of view. And some people you hit with a whip and some people are dragging you by the nose, I fell somewhere in between.

Swent: It would be interesting to go back twenty years from now and see what the impact has really been in Lake County. We can't go back and see what the impact has been at Homestake because Homestake won't be here. But maybe Barrick, to see the changes that will be inevitable.

Krauss: That's the true historian's perspective. That way we can see your bias. [laughs] But I think it's true. One of the nice things about McLaughlin is there's fairly extensive documentation and if one of the upcoming historians twenty years from now wanted to do that, the materials would be there to do it.

Swent: It would be really interesting to see what had happened down the road.

Krauss: But I do really think these are trends in the context more so than the products of individual activity. The efforts are much too complicated and much too big to depend singularly on one point of view. And if that were true, then some of these people who are beating their shoes on the table and saying don't cut another tree, we wouldn't be cutting trees any more. So obviously there's something else at play here than just--

Swent: Well, we either have to cut trees or dig holes for cement.

Krauss: Yes, right. But having some sense of what those trends are is helpful. And moving with them.

Swent: Well, I guess we've pretty well wrapped it up, haven't we, Ray?

Krauss: I think so. I'm convinced that I have nothing more to say.

Swent: You might think of something.

Krauss: Until I get into the truck on the way home and then I'll say, I wish I had told her this!

Swent: Well if you think of that, jot it down and let me know.

Krauss: No, I think we've done an admirable job.

Swent: Was there anything else that you wanted to say? Anything you would do differently if you had a chance to do it over?

Krauss: I don't have that chance, so I don't dwell on it. Just my thanks to you for your support and interest over the years.

Swent: Well, none of this would have happened without you, either. Your help has been invaluable, really. Really.

Krauss: Thanks.

Swent: Now I just hope we can make sure that all the records are preserved some way.

Krauss: We'll work on it. I'll join you in that crusade.

Swent: I really appreciate your coming down to do this interview.

Krauss: My pleasure, thanks.

Swent: Thank you!

Transcribed by Shannon Page, Estevan Sifuentes, Mim Eisenberg, and Teresa Bergen
Final Typed by Shannon Page

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A DEAN ENDERLIN

HOMESTAKE
MINING COMPANY

McLaughlin Mine

WARN ACT NOTIFICATION

April 24, 1996

Dear Dean Enderlin,

This letter is Homestake Mining Company's notice to you of the cessation of mining operations at McLaughlin which will cause employment loss under the Worker Adjustment and Retraining Act (WARN). This WARN notice covers only Homestake Mining Company's McLaughlin Mine/Mill located on Morgan Valley Road near Lower Lake, California. Regrettably, this reduction in force will affect you and you will be placed on lay off July 31, 1996. Phased layoffs will begin June 28, 1996 and will be completed by December 31, 1996. Homestake Mining Company plans a permanent cessation of mine operations and the continuation of mill operations through a Direct CN process.

As I have emphasized in the past, I have always appreciated the open and cooperative manner in which we were able to accomplish so much at McLaughlin together. We have come through adversity, especially with the rains of the past two winters, and have performed remarkably well. This proves once again what we have always said at McLaughlin - it is the people that make the difference. Allow me to take this opportunity to thank you for your efforts during your time with McLaughlin.

The Human Resources Department has prepared the attached summary which describes severance pay and benefits options. Please read it carefully and return the Severance Option Form to Judy Kauffman by May 31, 1996. If you have questions about your severance benefits, contact the Human Resources Department.

Again, I express my gratitude for work times spent together for the common goal. May your future be rewarding and filled with positive experiences.

Sincerely,

Pat Purtell
General Manager

Homestake Mining Co., McLaughlin Mine
26775 Morgan Valley Road
Lower Lake, CA 95457

Telephone (707) 995-60
FAX (707) 995-60

Oakland Tribune, December 28, 1997.

Dean Enderlin, a senior environmental engineer for Homestake Mining Co., walks on ground cover planted atop a capped waste rock pil near McLaughlin Mine. Oak trees and grass will cover the site, which is to become an ecology research station. See story A-10.

State still bears Gold Rush mining scars

Nearly 150 years after miners began plucking gold from California's rivers and mountains, the scars of their mighty effort still mar the state's landscape.

While only fragments of yesterday's vast fortunes are evident today, the environmental fallout of the lustful search for gold is a panorama frozen in time. And it is not a pretty picture.

Streams, rivers, canyons and forests of the northern Sierra Nevada range are pockmarked with devastating souvenirs of the intense mining that went essentially unchecked from the time gold was discovered at Sutter's Mill in 1848 until nearly the turn of the century.

This isn't the kind of image that usually comes to mind at the mention of "49ers" — a bandwagon of dusty old prospectors who raided the state's mountains with pickaxes and its streams with pans, sleeping under the stars in makeshift camps.

Although individual prospectors were far from gentle with the land, larger outfits that used hydraulic, suction dredging and pit mining

Please see **Gold,** A-11

■ **story by Dennis Oliver** photos by **Nick Lammers** ■

Continued from A-1

methods to rip apart as much gold-laced ore as possible wreaked most of the damage.

Among pine and oak forests 15 miles northeast of Nevada City, for example, the strange and awesome effects of hydraulic mining are preserved at Malakoff Diggins State Park as a monument to the gold rush era.

There, at the height of the feverish scramble for gold, miners shot cannons of pressurized water at mountainsides to wash away sediments, then leached the precious mineral from the ore by applying toxic mercury. Barren, gouged cliffs remain where vast expanses of forest once rose skyward.

"It takes a lot for plants to grow when there isn't any soil left," said Rick Humphries, a geologist with the state Department of Water Resources. "A lot of people don't remember how much mining went on up there."

Malakoff and similar ruins are striking relics of the 19th century methods of desperate treasure hunting. So are the near disappearance of the red-legged frog and the virtual destruction of first-growth foothill forests. The frogs were eaten by miners and the forests felled for firewood and construction materials by those in search of instant wealth.

At Malakoff, enough sediment to fill 3,000 dump trucks still drains each year from a washed out canyon, where the sound of pebbles and dirt dropping from naked cliffs interrupts the eerily silent mornings.

Downstream, creeks and rivers are stagnant and lifeless. The water and rocks in Humbug Creek directly below Malakoff are stained orange by loads of iron leaching from the hills. These sediments have choked the life out of the food chain at its very basic beginnings.

But the Gold Rush's environmental afflictions were not restricted to the foothills.

Before hydraulic mining was banned in 1884, floods carrying silt, mud, gravel and rocks from the washed down canyons covered entire communities in the Sacramento Valley, destroying crops along the way. Streams laden with sediments from hydraulic mining and other digging methods spread to Delta and Bay lands, leaving deposits several feet high in some spots.

After hydraulic mining lost its luster, the equally destructive practice of suction dredging caught on. Huge vacuum tubes were embedded into the bottoms of Mother Lode rivers to suck underlying sediments up through filters. That process left deeply gouged river beds.

The toll of such mining practices reached far.

The Emeryville shoreline and adjacent baylands where the San Francisco-Oakland Bay Bridge approach now touches down in Oakland, for example, were created from fill that washed out of mines 150 miles away. Even today, the Bear River northeast of Sacramento is choked with rocks from the mines it still drains out of.

"Huge areas that would still be mountains today are now down in the cities," said Christopher Richard, an aquatic biologist from the Oakland Museum of California. He researched the environmental damage of the gold rush for an exhibit commemorating the 150th anniversary of the original gold find at Sutter's Mill.

The rush was on

The Jan. 24, 1848 discovery triggered a massive migration West — by foot, by horse, by wagon, by sailing ship around Cape Horn. The gold rush transformed California's towns and countryside from sleepy hamlets to economic boom towns. Conquering nature meant fabulous wealth.

The population explosion alone was enough to put substantial pressure on the state. California grew from about 14,000 people in 1848 to 100,000 in 1850. Two years later, that number soared to 250,000. By 1860 there were 380,000 people in the state.

"The pulse of people was so huge that it was taxing the distribution of food," Richard said.

To fix that, large sections of the Central Valley's wetlands were rapidly diked for farming, resulting in one of the largest artificially altered environments on Earth. Farm irrigation was a direct byproduct of the gold rush, as water was diverted for crops in the same way it had been for mining.

A ranching boom saw streams and rivers trampled by hooved animals like cows and sheep. Particularly damaging were the sheep, which left pits in the mud that became fertile for the seeds of exotic, invading plants. Hungry miners gobbled up so many of the once plentiful red-legged frogs that today they are an endangered species.

Cannons capable of spraying birdshot over a wide area were used to blast hundreds of ducks at a time out of the skies above Oakland's Lake Merritt and other Bay marshlands to feed those attracted to the state by the mining craze. Millions of bird eggs were snatched from nests on the Farallones Islands off the San Francisco coast for food — and large quantities of fish were plucked from rivers.

Not far from the spot in Coloma where gold was discovered on the American River, meadows that if undisturbed would be flat, pleasant grasslands today are sliced by wide trenches. Miners were so desperate for that last speck of gold they tore down the town's buildings to look beneath them.

The result of this and of the uncontrolled logging that occurred around the town north of Placerville 150 years ago is a landscape pitted and scarred, littered with cobblestones, and surrounded by pygmy-forested hills. The state only recently began excavating areas where the buildings once stood, in its search for historic artifacts discarded and buried in haste.

"You can look around town and you see piles of cobblestone," said Matthew Sugerman, superintendent of the town, which is now a state park. "The hills are all second- and third-generation forest because when you've got 10,000 people in this valley, you've got to cut the wood to keep them warm."

As urban growth continues to spurt across the Central Valley and up the Sierra foothills, authorities also are finding that environmental relics of the search for gold may be harmful to some current residents.

A toxic legacy

Because early miners used mercury to help extract gold — most of the time directly in rivers and streams — untold amounts of toxic sludge raced through Sierra canyons.

Because state laws in the 1870s required miners to minimize sedimentation and flooding downstream, crude dams were built to capture the poisonous runoff. Not until it became clear the dams wouldn't work — debris piled up and eventually flowed over them — was hydraulic mining banned.

Those dams, with tons of toxic debris trapped behind them, still litter the Sierra foothills. Authorities fear many are in danger of collapsing.

"There might be an awful lot of mercury caught up in the bottom of these dams, and if they fail we might have a sedimentation problem," said Humphries, who is studying topographical maps in search of the abandoned dams. "We just don't know about the safety of these structures."

One such dam — constructed solely of logs more than 100 years ago — broke apart during the January 1997 floods, sending toxic debris into a residential lake near Nevada City, Humphries said. Nearby residents continue to monitor water in their wells as a result.

In Amador City, new homes were built on waste soil from an old mine — raising questions about whether concentrated levels of arsenic produced in the mining process would be a problem for residents.

"As people move into these areas, they're running into these legacies of the 19th century," Humphries said.

from "What's Cookin' at McLaugh
1992, edited by Debbie Aber,
Alyson Hyatt, and Pam Lucas.

Why the Name, McLaughlin?

The name is in honor of Dr. Donald H. McLaughlin...a man who contributed immensely to the success of the Company. Dr. McLaughlin was hired by Homestake in the 1920s during a time when the Company feared that gold ore reserves were running out in the Homestake mine at Lead. Although he was a young geologist, his abilities soon became evident. He not only found more gold ore for Homestake, he also helped develop a new and more efficient method of mining it! Dr. McLaughlin continued with Homestake, and worked his way to prominence in the corporate structure. He was president of Homestake from 1944 to 1960, and served on the Board of Directors until his death in December 1984. He died just three months before the first gold bar was poured at the McLaughlin mine. He was pleased and proud of this property which bore his name.

Dean Enderlin
McLaughlin Tour Guide Script

DEAN'S BEANS

2¼ c. pinto beans
½ tsp. baking soda
2 large diced onions
2 cloves garlic
1 lb. sausage
1 can tomato sauce
1 can chicken broth
½ tsp. black pepper
¼ tsp. oregano
½ tsp. Mexican sage
¼ tsp. cumin
1½ Tbsp. chili powder
Jalapeno peppers (see following)

1. Sort beans and soak overnight.
2. Drain in morning. Cover with fresh water. Add baking soda; boil 15 minutes.
3. Drain. Cover with fresh water. Cook slowly, under low heat.
4. Brown sausage while beans are cooking. Add onions and garlic as sausage begins to brown and saute until tender.
5. Add tomato sauce, broth, pepper, and other seasonings to sausage. Let simmer about 5 minutes.
6. Turn mixture into kettle with beans. Boil slowly 2½ hours or until beans are thoroughly tender. Serves 8.

Note: Use 2 jalapeno peppers for medium heat. Use 3 if you're a fire-breather like me!

Dean Enderlin

THE DISCOVERY

Homestake's discovery of the McLaughlin gold deposit was by no means an accident. It was the direct result of a major reorganization program which involved the modification of the Company's exploration management structure and philosophy. Further incentive to explore for new deposits was sparked by the escalating price of gold. An intensified exploration effort, called the Mercury Hot Springs Reconnaissance Program, was implemented in 1978. The program was based on a geologic model which proposed that economic gold deposits could exist in extinct hotsprings systems. Following the model, Homestake geologists investigated an old California mercury district, known as the Sulphur Creek Mining District. This area, located in Colusa County and 14 miles north of the McLaughlin mine, had actually been mined for both gold and mercury in the late 1800's. It was the perfect place to test the validity of the model. Although this deposit was found to contain widely distributed gold values, it was simply too small to justify the expense of setting up a mining operation. The model was supported, however, and exploration activities were expanded to neighboring mines. The Manhattan mine (now McLaughlin) was one of those mines. The rest is history!

Dean Enderlin
McLaughlin Tour Guide Script

Date: Wed, 22 Aug 2001 21:43:31 -0700
From: Dean Enderlin
To: "Krauss, Raymond"
"Swent, Eleanor"
Subject: Attention PERM charter members...

Dear Charter Members of PERM (Paleozoic Ecosystem Reconstruction Movement),

As you are aware, our movement is devoted to undoing the catastrophic effects of the Permo-Triassic mass extinction (PTME), no matter what the cost. Although our membership is small, I know how devoted each of you is to our cause, and I want you to know that PERM has recently made great strides in identifying possible causes of the greatest environmental atrocity in earth history.

I am confident that soon we will be able to formulate remedial plans to restore the earth to its pristine Paleozoic beauty. How rewarding it will be to see the ocean (there was only one at the time) teaming with Brachiopods and Trilobites once again!

In spite of many decades of research, scientists are still divided with regard to the exact cause of the extinction. Several hypotheses have been postulated. PERM is understandably frustrated by this slow process, so we intend to launch a three-phase program to move forward toward our goals, regardless of the indecisive state of the scientific community. Phase 1 will implement countermeasures for each of the postulated root causes for the PTME. Preventive measures will assure that such threats will not destabilize our Permian populations again. Phase 2 will involve the eradication of post-Permian species (present company not included, of course). Phase 3 will implement the restoration of Permian ecosystems once the threats of competition and future annihilation have been removed. We will deal with Phases 2 and 3 issues in another newsletter. For now, let's consider implementation of Phase 1:

For the sake of priority, we have divided causes into two groups: Probable and Improbable. We believe that improbable causes must be addressed for the sake of conservatism. To do otherwise would be to compromise the ethical obligation of our organization.

Improbable Causes include "hypercanes" (mach-velocity cyclonic winds) produced by comet/asteroid impact, sea level changes, global warming, excess gamma radiation due to a supernova 30 light years from earth, and continental drift. Probable causes include volcanic activity and oceanic anoxia (both probably related to drastic changes in atmospheric CO2).

At first glance, one might think that measures to halt some of the above processes would be futile. Don't be discouraged. Our cause is just, and our membership is highly capable. Asteroid impacts, hurricanes, volcanoes, continental drift, and supernovae are not obstacles. They are merely technical challenges! This is truly an exciting turning point in our campaign. Once we stabilize these threats we can proceed with extermination of all the "exotic" species that have infested earth ecosystems for the past 251 million years. I can hardly wait! Remember, we're doing this for the Trilobites!

Ray has advised me that he will be talking with Mike Thompson soon. I trust that Ray will provide full details of PERM's activities to Congressman Thompson during this visit.

As always, I will keep you posted as PERM advances its cause!

Dean Enderlin
(self-proclaimed) Director, Paleozoic Ecosystem Reconstruction Movement

PS -- Several of our critics have pointed out that our efforts will be undone in the next 1.1 billion years, as the natural solar intensity of our sun gradually increases. They claim that the oceans will boil away in a mega-greenhouse effect, and all life will be destroyed over that period. They also claim that earth will be engulfed when our sun inflates 166x in a helium flash in 8 billion years. Pay no attention to these nay-sayers! Obviously, they don't recognize the resourcefulness of PERM!

B SUSAN HARRISON

SUMMARY

This nomination asks the Ukiah Field Office of the US Bureau of Land Management (BLM) to consider designating the Knoxville Public Lands as an Area of Critical Environmental Concern (ACEC), and also to consider designating all or part of these lands as a Research Natural Area (RNA).

Three exceptional attributes of the Knoxville Public Lands are identified: (1) A geologically and botanically unique ecosystem, supporting more rare or unusual species restricted to serpentine soils (49 plants and several animals) than are known from any area of protected public lands in California or the US. (2) The existence of an especially unusual and fragile habitat type, here termed "serpentine wet areas" (seeps, streambanks and wet meadows), which contain at least 26 habitat-specialist plant species including 5 sensitive taxa, and which are not well represented in existing ACECs and RNAs. (3) An outstandingly high level of past, present and planned future activity in scientific research and environmental education.

The above attributes meet the ACEC criteria of *relevant* and *important* environmental values that are of *greater than local significance*. The *need for special management attention* to protect these environmental values is also described. This nomination concludes that the Knoxville Public Lands both merit and require the level of environmental concern conveyed by ACEC status. Based on their unusual plant and animal associations and unusual geologic features, and on the high level of scientific interest they have attracted, the Knoxville Public Lands would also be an exceptionally suitable and valuable addition to the RNA system.

CURRICULUM VITAE

6/13/00

Susan Patricia Harrison
Born October 3, 1961; Sonoma, California

Department of Environmental Science and Policy
University of California - Davis, One Shields Ave.
Davis, CA, U.S.A., 95616
(530) 752-7110
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ACADEMIC POSITIONS

Research Associate, Center for Conservation Biology, Stanford University (Sept. 1986 - Dec. 1989)

Postdoctoral Fellow, Morrison Institute for Population and Resource Studies, Stanford University (Sept. - Dec. 1989)

Postdoctoral Researcher, Centre for Population Biology, Imperial College at Silwood Park, England (Feb. 1990 - Aug. 1991)

Assistant Professor, Division of Environmental Studies, U.C. Davis (July 1, 1991 - June 30, 1996)

Associate Professor, Division of Environmental Studies, U.C. Davis (July 1, 1996 - June 30, 1998)

Professor, Department of Environmental Science and Policy, U.C. Davis (July 1, 1998 -)

AWARDS (POST-Ph.D)

1996 International Recognition of Professional Excellence Award
(International Ecology Institute, Oldendorf, Germany)

EDUCATION

B.S. (Zoology) 1983, University of California, Davis

M.S. (Ecology) 1986, University of California, Davis

Ph.D. (Biology) 1989, Stanford University

RESEARCH INTERESTS

My research focus is the role of spatial factors, such as habitat geometry and dispersal, in population dynamics and patterns of biological diversity. My goals within this area are:

1. to test and refine theories concerning metapopulation dynamics (dynamics of extinction and colonization);
2. to identify the spatial scales at which habitat patchiness and lack of dispersal influence the species composition of communities;
3. to improve the management of native species and communities in naturally patchy or recently fragmented habitats.

SCIENTIFIC PUBLICATIONS

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GRANTS

NSF Research Planning Grant, "Linking Population Processes and Biogeography: A Geographic Study of an Insect Herbivore" June 1993-Dec. 1994 ($18,000).

NSF Conservation Biology, "Plant Communities on Patchy Serpentine Outcrops: Spatial Structure and Ecological Interactions," June 1995-May 1998 ($150,000).

NSF Ecology, "Spatial Dynamics of an Outbreaking Insect Population" (with A. Hastings), July 1996 - June 1999 ($200,000)

NSF Ecology, "Multispecies metapopulation dynamics: experiments in a model system" (PI: Marcel Holyoak), June 1996 - May 1999 ($120,000).

NSF Ecology, "Understanding the regional distribution of native meadow remnants in Northern California," July 1999 - June 2002 ($150,000).

National Center for Ecological Analysis and Synthesis, "Change in California Grasslands: A Workshop Proposal" (with M. Stromberg, C. D'Antonio, C. Malmstrom, and K. Rice), June 2000-June 2002 ($30,000).

NSF Ecology, Small Grants for Exploratory Research (SGER), "Effects of Wildfire on Aquatic and Terrestrial Ecology in an Oak Woodland-Chaparral Ecosystem (with D. Slotton), January 2000-January 2001 ($50,000).

Andrew W. Mellon Foundation, "Plant Diversity in Spatially Complex Landscapes: Ecological and Evolutionary Responses to Environmental Structure," June 2000-May 2003 (with S. Collinge, R. Grosberg, K. Rice, M. Stanton, D. Thiede), $300,000.

NSF Ecology, "Regional and local diversity in a patchy environment: serpentine plants in California," July 2000-June 2003 ($271,000).

Packard Foundation Interdisciplinary Science Program, "Ecological and Evolutionary Responses to Habitat Mosaics: Integrating Across Spatial and Temporal Hierarchies of Plant Biodiversity." July 2000- Jone 2005 (with K. Rice, S. Collinge, P. Gepts, and M. Stanton), $998,200.

PROFESSIONAL SERVICE ACTIVITIES

1993-7	Panelist, National Science Foundation, Ecology program
1994-6	Member of Council / Governing Board, Ecological Society of America
1994-	Associate Editor, Conservation Biology
1995-7	Associate Editor, Acta Oecologica
1995-7	Editorial Board, American Naturalist
1999-	Young Investigators Award committee, American Society of Naturalists
1999-	Research Advisory Committee, Organization for Tropical Studies
1999-	Research Committee, Ecological Society of America
1999	Biological Observatory Network committee, National Science Foundation
2000-	Scientific Advisory Board, National Center for Ecological Analysis and Synthesis

UNIVERSITY SERVICE ACTIVITIES

1997-	Chair, Conservation Biology Area of Emphasis, Graduate Group in Ecology
1998-9	Faculty coordinator, UC Davis Natural Reserve System
1999-	Director, UC Davis Natural Reserve System
1999-	Faculty advisory committee, John Muir Institute of the Environment
1999	Divisional Associate Dean search committee, College of Agricultural & Environmental Sciences

PUBLIC SERVICE ACTIVITIES

1991 Reviewer, "A Multi-Resource Conservation Strategy for the Northern Spotted Owl," for U.S. Forest Service

1992 Expert witness, Seattle Audubon Society vs. Moseley, regarding the U.S. Forest Service's management plans for the Northern Spotted Owl

1993 Reviewer, "Biodiversity and the Great Whale Hydroelectric Project," for Canadian Government

1994 Invited speaker, National Stewardship Conference, The Nature Conservancy.

1994 Reviewer, Ecological Society of America policy statements on the Endangered Species Act and the Forest Ecosystem Management Assessment Team (FEMAT) report.

1994 Reviewer, proposed revisions to management plans for the Tongass National Forest, for Association of Forest Service Employees for Environmental Ethics (AFSEEE).

1994 Panelist, Wildlife/Aquatic Community Assessment workshop for California Spotted Owl management plan, for U.S. Forest Service.

1994 Invited speaker, Priority Program on the Environment, Zurich, Switzerland.

1995 Contributing author, Global Biodiversity Assessment, by the Scientific Committee on Problems of the Environment (SCOPE) for United Nations Environmental Program

1995 Reviewer, Draft Environmental Impact Statement by U.S. Forest Service, "Managing California Spotted Owl Habitat in the Sierra Nevada National Forests of California," for Natural Resources Defense Council

1995-6 Contributing author, The AFSEEE Alternative for the Tongass National Forest, for Association of Forest Service Employees for Environmental Ethics

1996 Reviewer, Draft translocation guidelines for the Karner Blue butterfly, for the New York State Department of Conservation

1996 Reviewer, Proposed recovery plan for Mitchell's Satyr Butterfly, for US Fish and Wildlife Service

1996 Invited speaker, National Biological Survey, Washington DC

1996 Consultant on the management of the Karner Blue Butterfly in the Albany Pine Bush, for The Nature Conservancy and the Albany Pine Bush Commission

1996-9 Board of Advisors member, Association of Forest Service Employees for Environmental Ethics

1998 Reviewer, Draft Recovery Plan for Serpentine Soil Species of the SF Bay Area, for US Fish and Wildlife Service

1999 Committee to review the Scripps Coastal Reserve, UC Natural Reserve System

1999 Chair, Sedgwick Ranch Reserve planning workshop, UC Natural Reserve System

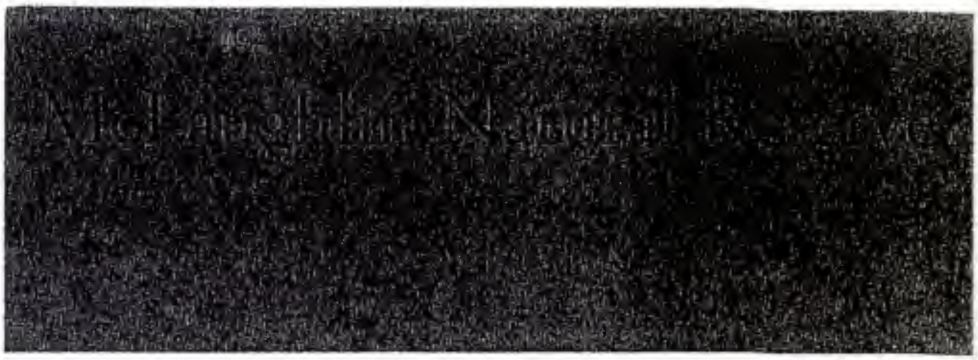
1999- Member, Board of Trustees, Land Trust of Napa County

INVITED LECTURES, 1994-1999

University of Quebec at Montreal, February 1994
Colorado State University, March 1994
University of California - Santa Cruz, April 1994
University of California - Irvine, May 1994
University of Montana, May 1994
Ecological Society of America symposium, "Population Stability and Outbreaks," August 1994
Ecological Society of America symposium, "Dynamics of Biodiversity," August 1994
California State University - Sacramento, September 1994
California State University - San Diego, October 1994
University of British Columbia, October 1994
University of Zurich, Switzerland, November 1994
Dalhousie University, Canada, November 1994
University of Kentucky, February 1995
University of Edmonton, March 1995
University of New Hampshire, April 1995
University of Maine, April 1995
Entomological Society of America symposium, "Invertebrate Conservation", December 1995
Washington State University, March 1996
University of California - Berkeley, March 1996
Duke University, September 1996
University of Massachusetts, November 1996
National Center for Ecological Analysis and Synthesis, "Universal Phenomena in Ecology", March 1997
Nordic Council on Ecology, "Modelling Populations in Landscapes", Aarhus, Denmark, March 1997
University of Maryland, April 1997
U. C. Santa Barbara, June 1997
Ecological Society of America and The Nature Conservancy joint symposium, "Application of Landscape Theory to Conservation", August 1997
Ecological Society of America symposium, "Building Empirically-Based Theory", August 1997
San Francisco State University, October 1997
Uppsala University, Sweden, October 1997
University of Helsinki, Finland, April 1998
University of Tartu, Estonia, April 1998
Brown University, October 1998
Harvard University, October 1998
International Prize in Biology Symposium, Hayama, Japan, December 1998
Colorado State University, Distinguished Visiting Ecologist, April 1999
University of Minnesota, September 1999
University of Washington, March 2000
Society for Conservation Biology symposium, "Spatial Issues in Conservation", June 2000
California Botanical Society, UC Berkeley, October 2000

NRS
NATURAL
RESERVE
SYSTEM

UNIVERSITY OF CALIFORNIA



McLaughlin Natural Reserve

SITE SPECS

ADMINISTERING CAMPUS
UC Davis

ESTABLISHED
1992

LOCATION
Napa and Lake Counties, boundary of Putah Creek and Cashe Creek watersheds, northwest of Davis; two-hours from Davis campus.

SIZE
776 ha (1,940 acres)

ELEVATION
366 to 732 m (1,200 to 2,400 ft)

AVERAGE PRECIPITATION
62 cm (24 in) per year

AVERAGE TEMPERATURES
July 25°C (77°F), January 8°C (46°F)

FACILITIES
Interim research station with computers, bunkroom, classroom, and kitchen provided by Homestake Mining Company with future facilities to be provided; storage space.

DATABASES
Excellent database and monitoring systems are available on site, with logistical support from the Homestake Mining Company.

PERSONNEL
Roving staff reserve manager; no on-site personnel.

CONTACT INFORMATION
Dan Tolson
Office of Research
410 Mrak Hall
University of California
Davis, CA 95616
Phone: 530-752-6949
E-mail: dhtolson@ucdavis.edu

NRS WEBSITE
<http://nrs.ucop.edu>

The McLaughlin Natural Reserve is located at the headwaters of Putah Creek and is one of only a few sites in California that protects unusual serpentine habitats for research and teaching. Chemically hostile to most plants, serpentine deposits cover one third of the reserve, creating islands of rare and endemic plants which have adapted to these harsh soils, along with numerous associated endemic insects. Where there are nonserpentine soils, the vegetation shifts suddenly to more typical coast range habitats, including riparian woodland, blue oak woodland and savannah, grassland, and chaparral. The reserve and adjacent lands are owned by the U.S. Bureau of Land Management and the Homestake Mining Company, which operates an innovative open-pit gold mine, funds environmental research, and maintains an extensive environmental database available for use in research and teaching.

SELECTED RESEARCH

Serpentine habitats: Dynamics and succession of serpentine chaparral; the spread of exotic grasses on serpentine.

Ant studies: Ant specificity to unique isolated habitats; determinants of polymorphism and foraging strategies in ants.

Host-association effect on herbivory of the Indian paintbrush species, *Castilleja minor*.

Ongoing research funded by the Homestake Mining Company includes biotransport of heavy metals in on-site watersheds and population studies of rare Townsend's big-eared bats.

SPECIAL PROGRAMS

Baseline data: The Homestake Mining Company has collected baseline data on the site's geology, soils, hydrology, air and water quality, archaeology, and terrestrial and aquatic ecology; ongoing environmental monitoring adds to the computer database.

Field courses: The site is visited by university courses in plant ecology, California floristics, geology, and creative writing.

Expanded facilities: Establishment of the reserve as an environmental-research field station is part of the long-term reclamation plan for the gold mine.

2/99 sgt

Where worlds collide: Guns, miners, nature

Riddled with holes, a makeshift shooting target hangs from a tree near a campground in the Knoxville public lands.

SAMANDA DORGER/REGISTER PHOTOS

A UC Davis student, on a week-long field class held in Knoxville public lands, wanders among the rusting remains of Knoxville resident Bill Wilder's former mercury mining operation.

The Knoxville public lands are a perfect spot for off-roaders, who might be forgiven for thinking that there's little to harm in the stony soil and shrubby brush. But for scientists, Knoxville holds treasures much more delicate than the rare metals once mined from its slopes. Scores of rare plants and insects flourish among the brush.

Law enforcement may come to Napa's badlands

By LOUISA HUFSTADER

Register Staff Writer

KNOXVILLE

For decades, gun enthusiasts, off-highway vehicle users and naturalists have roamed the remote Knoxville public lands that straddle the northernmost juncture of Napa and Lake counties.

This rugged highlands area, where mercury, gold and silver have been mined since the 19th century, is the San Francisco Bay Area's closest destination for public shooting and off-highway vehicle (OHV) recreation, only a two-hour drive from the city.

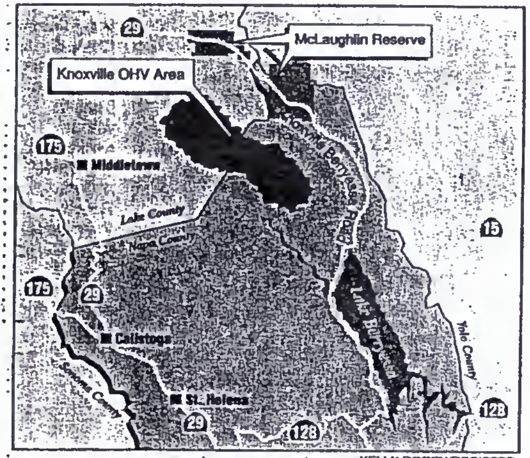
But some neighboring landowners and ecological researchers say that shooting and off-roading activity have gotten out of hand in Knoxville, endangering not only the area's rare native plants but also their own property and personal safety.

Rich Burns, field manager for the Ukiah District of the Bureau of Land Management, which manages the

See PUBLIC, Page 4A

PHOTO COURTESY SUSAN HARRISON

Although a designated shooting area exists in the Knoxville public lands, a number of impromptu shooting sites have sprung up in the area.



KELLY DOREN/REGISTER

BLM developing strategy for off-road vehicles

Draft of the plan will be posted on the agency's Web site

By LOUISA HUFSTADER
Register Staff Writer

KNOXVILLE

The Bureau of Land Management is developing a "Draft National Off-Highway Vehicle Strategy," scheduled for release Nov. 30 with a public comment period lasting until Jan. 1. The draft will be posted online at www.blm.gov, and printed copies will be available at field offices.

"The strategy under development will reflect substantial input from OHV user groups, environmental organizations, state and local agencies and the general public," according to Henri Bisson, the BLM's Assistant Director for Planning and Renewable Resources.

The BLM is an agency of the United States Department of the Interior. It administers 264 million acres of America's public lands, more than any other government entity.

The BLM Web site states that the agency "sustains the health, diversity, and productivity of the public lands for the use and enjoyment of present and future generations." Located primarily in 12 Western States, BLM lands are managed through a network of field offices.

The Ukiah field office manages approximately 300,000 acres of land in Northern California, from the Little Darby Environmental Education Area northeast of Willits, with its 1.5 miles of nature trails, to the 80,000-acre Cache Creek Management Area, which sprawls across Lake, Colusa and Yolo Counties.

A variety of activities takes place on these BLM lands, depending on their location. Hunting, fishing and camping are allowed at most areas, along with hiking and mountain biking.

Off-highway vehicle use is permitted at the 23,000-acre South Cow Mountain OHV Recreation Area southeast of Ukiah, which has 120 miles of developed trails, two campgrounds and two OHV staging areas, and at Knoxville, which has about 30 miles of trails, one campground and one staging area on its 17,700 acres in Napa and Lake Counties.

Public

From Page 1A

17,700 acre Knoxville tract, readily admits that Knoxville's remoteness makes it hard to police the area.

"Being way out there, it probably gives a person the feeling they can get away with more," he said.

Remote and rugged

No highways lead to Knoxville and its surrounding lands; the most direct route from Napa is by the Lake Berryessa-Knoxville Road that runs north from Lake Berryessa's west shore.

Located at about 2,400 feet above sea level, with views of both Berryessa and the Blue Ridge, Knoxville's rugged, often deserted terrain is covered with dense chaparral and threaded with abandoned mining roads.

It's a perfect spot for off-roaders, who might be forgiven for thinking that there's little to harm in the stony soil and shrubby brush. But for scientists, Knoxville holds treasures much more delicate than the rare metals once mined from its slopes.

Scores of rare plants and insects flourish among the brush, including "fire followers" such as the flower called Golden Eardrops, which appears only after burns like the fire that swept through the Knoxville and Berryessa region in September of 1999.

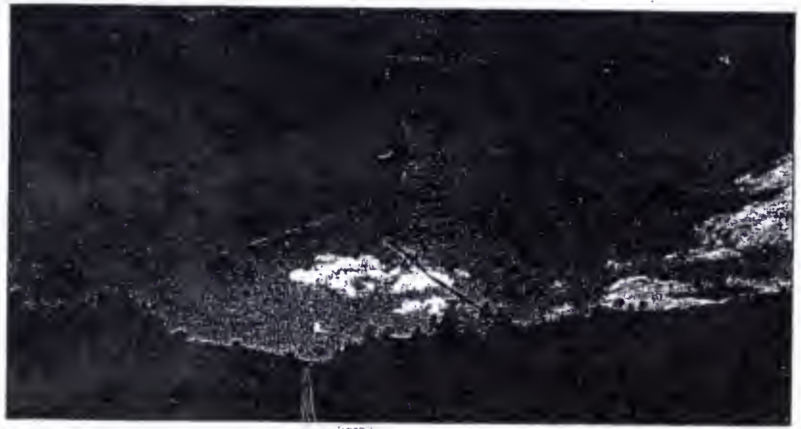
"You just never know"

Botanical researchers like Christy Brigham travel to the Donald & Sylvia McLaughlin University of California Natural Reserve, adjoining the BLM land, to study rare native plants called "serpentine specialists," which grow from the mineral-rich soils in the Knoxville region.

Brigham was on a field trip one Sunday last spring when she was surprised by a truck full of "guys driving over the plants, with beers in one hand and guns in the other.

"People get crazed," she said. "These guys drove through a barbed wire fence and over a huge tree to get into the research plot," where the rare plants grew.

There are more than 30 miles of trails for OHV recreation in



SAMANDA DORGER/REGISTER

Fenced off by barbed wire, the 7,000-acre McLaughlin Reserve is embedded in the rugged and desolate 100,000-acre Knoxville public lands. Snaking through it is the transcontinental fiberoptic cable that runs from New York to Asia.

adjoining private property like the Homestake Mining Company's McLaughlin Mine, the McLaughlin Reserve (once part of the mine) and private ranches.

Joe Erasmy, whose family has owned land adjoining Knoxville since the 1940s, said OHV drivers have even cut new roads through private land, particularly since 1999 when fires wiped out much of the chaparral that had previously been too thick for a vehicle to pass.

"They see the lake across the land, and they just want to get to it," said Erasmy, who warns women — including his wife — not to hike the area alone. "You just never know," he said.

Burns said that his office plans to "loop" some trails that lead to the boundaries with private property, to encourage drivers to stay on the public lands.

Kicking them out isn't an option. Since Ukiah BLM maintains Knoxville with funds from the state's sale of off-highway vehicle "green sticker" permits, Burns said, "that's the only source that we have to plug into" for money to manage the land.

Endangered plants

Susan Harrison, a professor in environmental science and policy at the University of California at Davis, is also the director for the UC Natural Reserve System, of which the McLaughlin Reserve — 7,000 acres embedded in almost 100,000 acres of publicly accessible land — is a part.

pressure the BLM to change its management plan for the Knoxville area, which she called "one of the richest areas in California, and thus the world," for serpentine specialist plants.

BLM has erected new barriers to protect sensitive plants from OHVs, Harrison acknowledged. However, determined off-roaders have repeatedly destroyed the barriers in order to reach the muddy streams and "seeps" (wet depressions) where they can have a good ride — regardless of the native plants growing there.

"They're obviously good botanists," said Harrison wryly. "They go straight where the sensitive plants are."

Unregulated shooting

BLM regulations prohibit shooting firearms "within 150 yards of a road, campground or trail," but these rules are routinely ignored in Knoxville. A number of impromptu shooting sites have sprung up in the area, some within sight of roads.

At one such spot, a broad expense of shot-up trash spreads directly from the road to a group of paper targets set up on a hillside. Pokemon cards, pages from an encyclopedia, and thousands of spent rounds — and even a few live ones — from shotguns, pistols and M-16 rifles litter the ground.

Brigham stumbled on an odd scene here last Easter Sunday morning, while checking on some plants in a nearby seep.

"Here are three guys, wearing their hearing protection, sitting in

stuffed purple Easter bunny, not that far from the road," recalled Brigham.

Brigham said she's not opposed to off-road recreation and shooting in principle, "but it has to be regulated so I feel safe, the plants aren't damaged and everybody has a good time. I've only seen a ranger once in hundreds of hours."

"To me, the shooting is the most serious issue we've got to deal with," said Burns. He said that his office plans to increase ranger patrols and close all but two areas to target shooting by early 2001.

"We need to get good management," Burns said.

Harrison, meanwhile, has nominated the Knoxville public lands for BLM recognition as an Area of Critical Environmental Concern (ACEC).

ACEC status will not provide any special protection for Knoxville, or require the BLM to change its use of the area, she said.

"It will simply recognize the important environmental value" of the land, Harrison explained, so that BLM "can't passively justify neglecting the place because 'it's a wasteland anyway.'"

Both Harrison and Burns had been scheduled to discuss Knoxville land use with the Napa County Board of Supervisors on Tuesday afternoon, but the agenda item has been moved to January.

Louisa Hufstader can be

C RAYMOND KRAUSS

HARDROCK MINING ON FEDERAL LANDS

Committee on Hardrock Mining on Federal Lands

Committee on Earth Resources

Board on Earth Sciences and Resources

Commission on Geosciences, Environment, and Resources

National Research Council

NATIONAL ACADEMY PRESS
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Sierra Club commends mine

LOWER LAKE — Homestake Mining Company (HMC) officials are now breathing a little easier. Yolo County Planning Commissioners unanimously approved the environmental monitoring plan for the McLaughlin Gold Project on Mar. 7.

Yolano Group, Mother Lode Chapter Sierra Club member Ada Merhoff spoke in support of the project but cautioned, "It is imperative that the concept of an independent review committee be implemented to monitor results of air and water quality surveillance.

She wanted data to be part of the public record in the press so that the public could follow the progress of the mining activity with assurance of environmental protection.

"We would be remiss if we did not publically state our feeling that Homestake Mining Company is commended for its willingness to accommodate the particular concerns of the interested public, and for its efforts to establish an environmentally sound mining operation here. Such cooperation from a large mining company is noteworthy and deserves due credit.

"Sierra Club is not opposing this project based on factors among which are; quality of the Environmental Impact Report, the semi-remote location, on going educational and research benefits to the public and a future fresh water reservoir for Yolo County wildlife."

A group of seven Capay Valley landowners who have opposed the project appeared before the commission to express their fears of air and water quality degradation because of the project. The Capay Valley is approximately 10 air miles from the project.

Lake and Napa counties have already approved permits for the multi-million dollar project and construction is underway in the two counties.

In hearings on environmental monitoring in Lake and Napa counties concerns were expressed by Solano Irrigation District (SID) and Anheuser Busch Brewing Company in Fairfield. It buys water from SID. After a review by their consultants, the environmental monitoring plan met the satisfaction of SID.

An outside independent engineering firm at HMC's expense reviewed the plan for adequacy. Brown and Caldwell officials, who appeared at Lake County hearings, lauded HMC's approach calling it one of the most comprehensive and detailed plans they had seen.

Portions of the McLaughlin Gold Project lay in the tri-county area of Lake, Napa and Yolo counties.

The ultimate development of the project had been threatened by Capay Valley protests because a 6,000 acre foot water reservoir planned for Davis Creek in Yolo County would be the major source of water for the mine and gold process plant. Twenty percent of the more than 20 million tons of gold ore that will be mined over the next 27 years are also in Yolo County.

Mining officials have been nervous lately about a source of water for the project. They recently received permission to use water from Hunting Creek for construction purposes from the state Water Resources Board.

This option had become tenuous because of the recent dry spell.

HMC also made an agreement with the Lower Lake County Water Works District One to buy water from their wells. A pipeline would be built from Lower Lake to the project. The district would receive a water storage tank and several new wells. Draw down studies indicated the water aquifer would not supply the amount of water needed for the project. Domestic water users have priorities.

Another option is to buy water from Yolo County Flood Control and Water Conservation District. An inlet would be dug into Cache Creek and water would be bought at $22.50 an acre foot, according to HMC. The drawback to that proposal is during drought years, the Yolo District can't draw water from Clear Lake. Cache Creek drains Clear Lake.

The dam and reservoir must be started by May in order to be completed in time for next winter's rainy season. The dam will be 953 feet long

drainage area and will have a surface area of 190 acres.

According to HMC, this dam is vital because water will be used to transport ground ore in a 4½ mile long slurry pipeline from the mine in Napa and Yolo counties to the gold process mill in Lake County.

Lake County was chosen for the mill because of the suitability of an impervious clay basin. The clay basin will be used for cyanide tailing disposals after gold is processed from the ore.

Stringent state water quality regulations prohibit contamination of ground or surface water and the Lake County site was chosen over a score of other sites because of the impervious clay basin.

Construction on the tri-county project began in September 1983. Six months later about eight percent of the project has been completed, according to Resident General Manager Jack Thompson.

Three major sub-contractors were awarded contracts on the project. The firm of Davy McKee is manager, overseeing construction, employment monitoring procurement and other phases.

The Argee Construction Company of Grand Junction, Colorado has completed 30 percent of their contracted work on pre-mine stripping, grinding site grading and completion of the M-1 sedimentation dam.

Their responsibility also includes construction of the Davis Creek Dam and aggregate production.

TIC The Industrial Company of Steamboat Springs, Colorado, will construct the gold process plant in Lake County and the ore grinding facility in Napa County. Preliminary work has begun. TIC has been a major participant in the Yuba College multi-purpose skills program which is teaching work skills needed by contractors. The first course to teach electrician's skills will graduate its first class in two weeks.

The second class was graduated Friday and their employment is guaranteed at the project.

Both Argee and TIC have been able to work through the winter months. McLaughlin Constructors, the third major contractor for the project, completed in the fall a small portion of the reconstruction of Morgan Valley Road. The 18-mile-long road will be reconstructed to county standards. The major work will begin in the spring.

McLaughlin Constructors will also build the tailings dam and slurry pipeline.

Lake Observer, Thursday, March 15, 1984

Clear Lake Observer, Thursday, May 15, 1986

No danger say mine officials

Toxic materials being shipped to gold mine

by Richard Mason

LAKE COUNTY — Homestake' Mining Company (HMC) has begun moving hazardous materials through Lake County to its McLaughlin Gold Mine facility in Napa County.

HMC began moving tailings from the former Empire Gold Mine near Grass Valley in Nevada County on April 29 after receiving permission from the Regional Water Quality Control Board and the state Department of Health Services.

The company plans to remove 43,000 to 50,000 tons of tailings from a state park at the Empire Mine site over a 2 to 2-1/2 year period.

According to McLaughlin Gold Mine Environmental Manager Ray Krauss, "It's an unusual situation where everyone benefits."

The disused tailings will be removed from an area where arsenic, cadmium and lead are leaching into creeks and streams. "We will render them nonhazardous," he said.

The tailings are being used in the gold recovery process to increase its efficiency. Krauss pointed out, that the tailings are high in sulfides which are needed in the McLaughlin process.

According to Krauss, 60 tons of Empire Mine tailings a day will be processed in the normal manner at the McLaughlin mine.

It will be ground with ore in a two-stage process at the mine site in Napa County, pumped 4-1/2 miles in slurry pipelines to the gold recovery plant in Lake County, where it is oxidized in autoclaves prior to gold recovery by traditional cyanidation methods.

Empire Mine tailings will reduce the amounts of sulfuric acid and propane gas needed at the gold recovery plant.

Plans call for four to six trucks a day — five days a week — to enter the county on Highway 20 from Grass Valley. HMC says there will be no increased traffic impacts because use of the sulfide rich tailings will reduce the number of acid and propane trucks.

County Planning Director Alex Hinds is reviewing the operation to determine whether or not HMC's use permit will have to be amended.

Hinds said the two main concerns are traffic and increased disposal of tailings. "There are a lot of other gold mines with tailings in the Central Sierra. It's not our intent to let HMC dispose of all those tailings here," said Hinds.

"HMC is an exemplary applicant. I'm confident it can be worked out," he added.

Last week before the Napa County planning commission HMC drew the fire of Commissioner Robert Lewis who said he wouldn't have voted to approve the project if he would have known that hazardous material were to be brought into Napa County.

"You made your own interpretation.

"If you are bringing in arsenic, cadmium and lead, they should be considered hazardous materials and the county should have been notified.

"Had this been in the original application, I would have voted against Homestake operating in Napa County — I would have voted against the whole project."

Lewis stressed, "This is a very small tail wagging a very large dog, in this case. I would not like to see people going on with the assumption that something that has hazardous potential okay."

The Napa commission ordered HMC to apply for a revised use permit but allowed continued transportation of the material into the county.

Krauss said the state Department of Health Services exempted the need for any environmental review. "The tailings won't be any different than the tailings that are already being put there. They're nonhazardous."

As an added benefit HMC will recover a small amount of gold from the tailings. One official said it was insignificant and would only pay for the transportation costs.

Clear Lake Observer, Wednesday, June 14, 1989 — A-10

Homestake's McLaughlin Mine honored

LOWER LAKE — A recent award by the Bureau of Land Management (BLM) recognizes the "sensitivity and dedication to the protection of flora and fauna in a mining environment on public lands" by Homestake Mining Company's McLaughlin Mine.

A certificate of appreciation was presented by BLM California State Director Ed Hastey to acknowledge the successful environmental programs of one of the nation's largest gold mines. It is located on both private and BLM land near the junction of Napa, Lake and Yolo counties.

"Homestake has shown extraordinary attention to the environment during start-up of McLaughlin and now in operation," Hastey said. "We are pleased to recognize this effort and the example it sets for mine operators throughout the industry."

Major mine operations in California such as Homestake's McLaughlin have earned a reputation for initiating measures that go beyond minimum compliance with rigid environmental protection standards set by the BLM and state and local agencies.

"It's good business to take care of the environment," said Ray Krauss, environmental manager at McLaughlin. "It's a standard of doing business by Homestake and the other major mining operators in California."

The McLaughlin project occupies 1,600 acres of an 8,000-acre site owned or leased by Homestake. Mining and mill site claims are located on land under BLM jurisdiction, which surrounds the operation on two sides.

Operations for the mine were approved by BLM in 1983 and production began in 1985.

Among the project's credits is recognition by the Association of Environmental Professionals of its Environmental Impact Report as the "Outstanding Environmental Document of the Year."

The Soil Conservation Society of America presented its merit award to Homestake for an "aggressive program in identifying, assessing and mitigating effects on the environment of the ore extraction, transport and processing" at McLaughlin.

The Native Plant Society also has commended the mining operation for use of native plants in revegetation and for steps to protect threatened native species.

Awards such as these underline the role of the environmental department at McLaughlin in implementing Homestake's philosophy that mining be environmentally responsible.

In addition to departmental focus on environmental monitoring, permit compliance, governmental relations and reclamation programs, the environmental staff has recently instituted a unique effort aimed at relocating and protecting maternity roosts on the McLaughlin site for one of California's most endangered bats — the western subspecies of Townsend's big-eared bat.

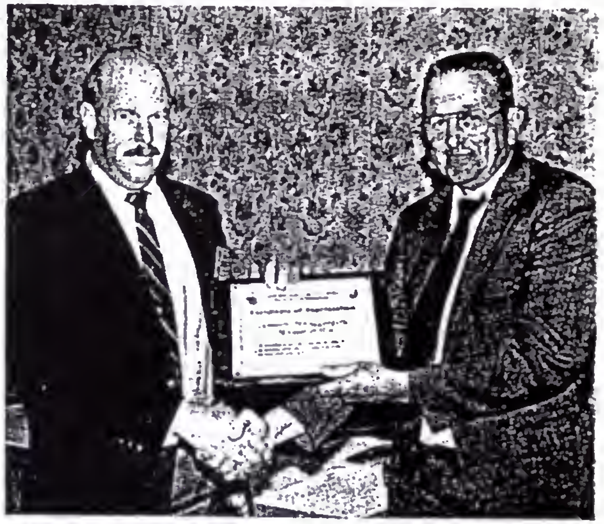
Until bat biologist Dr. Elizabeth Pierson began onsite research last year for the Department of Fish and Game, the mining company was unaware that ongoing construction was inadvertently destroying important bat roosts in old tunnels.

Homestake stopped mining activity in the threatened roost area until alternate tunnels could be found and a colony relocated. In addition, gates were constructed to protect the bat colony from human disturbance and automatic monitoring equipment installed to record bat activity in and out of the roost.

According to Pierson, the recent spring inventory shows that the number of breeding female Townsend's big-eared bats at McLaughlin has increased from 60 to 86. Success of the effort has spurred BLM and a naval base to consider similar programs.

Environmental studies were a significant part of the five-year permitting and regulatory process for McLaughlin after Homestake drilled the first exploration hole in September1979. Among areas addressed were air quality, meteorology, surface and ground water quality, vegetation, wildlife, area geology, cultural resources, noise and socioeconomics.

Estimated environmental costs for the total McLaughlin project, from studies to special facilities, exceeded $40 million. Annual cost for environmental programs including monitoring and mitigation is about $1.5 million. Homestake's 1988 Annual Report cites McLaughlin's production at about 204,000 ounces with operating earnings for the year of $19.1 million.



Ray Krauss, left, environmental manager for Homestake's McLaughlin Mine, recently accepted a certificate of appreciation award from the Bureau of Land Management State Director Ed Hastey in recognition of the mining company's "sensitivity and dedication to the protection of flora and fauna in a mining environment on public lands." The McLaughlin Mine is located on both private and BLM lands near the junction of Napa, Lake and Yolo counties.

The Chiles Award Papers
December 1993

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THE MCLAUGHLIN MINE: A 21ST CENTURY MODEL

by Raymond E. Krauss

Abstract

The boom of precious metal mining over the last decade has brought economic prosperity and environmental challenge to many communities in the Intermountain West. Large in scale and inherently disruptive of the environmental status quo, these mines are increasingly adopting a new generation of environmental practices with the potential to not only protect the resources of the high desert, but to also reclaim disturbed areas for productive use and in some cases to restore and enhance the resource values of the surrounding landscape. The McLaughlin Mine, situated in the Coast Range north of San Francisco, is acknowledged to be a model of effective environmental practice. Discovered and brought into production early in the current gold boom, the success of the mine's proactive planning and permitting process, pollution prevention features, and reclamation and habitat management programs is stimulating the adoption of these new practices throughout the west. McLaughlin's comprehensive environmental monitoring confirms the ecological effectiveness of these practices. Production and cost reports demonstrate their economic effectiveness as well. Concurrent reclamation returns disturbed areas to productive use. Wildlife habitat management programs restore and enhance the resource values of the surrounding, historically abused landscape. The entire 10,000 acre site will ultimately become an environmental studies field research station for the University of California.

Throughout human history, the advance of civilization has been inextricably tied to the quest for mineral resources. The history of the Intermountain West is no exception. Populated in the nineteenth century by prospectors, geologists and miners, the area remains North America's greatest storehouse of mineral resources. Fueled by technological innovation and economic change, the production of gold in the United States has seen a 500 percent increase in the last decade alone.

International demand for the precious metal increases annually. Gold, because of its unparalleled conductive properties, is used increasingly in electronics and telecommunications while its reflective properties are exploited in space technology and heat reflective glass. Gold's aesthetic allure and reliable retention of value continue to demand over 80 percent of each year's production for jewelry. But most

(Continued on page 2)

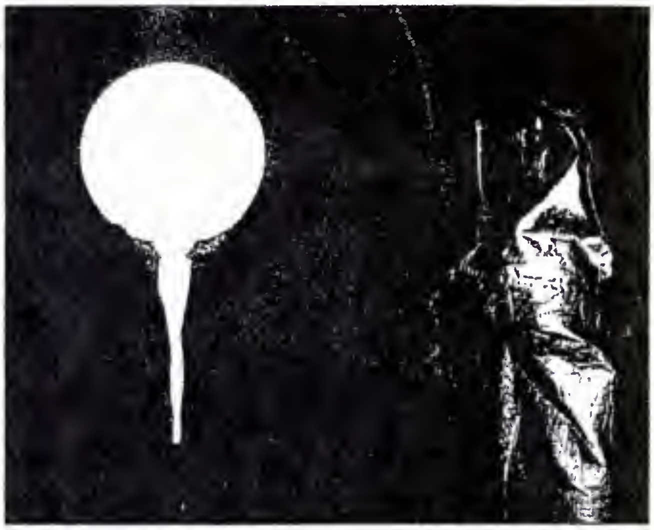

Fig. 1. *At the McLaughlin refinery, molten gold is poured into molds at the rate of two or three bars per day. Each bar weighs between 500 and 1000 troy ounces. Photo by R. Krauss.*

THE EARLE A. CHILES AWARD RECIPIENT

Raymond E. Krauss

For the application of environmentally sound management principles to the mining and extraction of mineral resources in the Intermountain West

Publication of this paper coincides with the selection of Raymond E. Krauss as the recipient of the 1993 Earle A. Chiles Award, which recognizes an individual for his or her accomplishments in promoting thoughtful management of the natural resources of the Intermountain West, or for the resolution of conflicts involving these resources.

The annual award, a $10,000 cash prize funded by the Chiles Foundation of Portland, Oregon, was established in 1983 in honor of Earle A. Chiles—Oregonian, businessman and philanthropist. It is presented by The High Desert Museum of Bend, Oregon, a natural and cultural history museum whose mission is to broaden the knowledge and understanding of the natural and cultural history and resources of the High Desert for the purpose of promoting thoughtful decision making that will sustain the region's natural and cultural heritage.

Mr. Krauss is the environmental manager for Homestake Mining Company's McLaughlin Gold Mine in Lower Lake, California. Environmental policies and procedures introduced by Mr. Krauss at McLaughlin Mine have helped set the standards for the newest wave of open pit mines being developed throughout the Intermountain West.

Mr. Krauss is a member of the California State Mining and Geology Board and serves on a Blue Ribbon Task force appointed by the California Department of Conservation.

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fundamentally, gold is treasured as an internationally recognized, universal store of, and standard for, economic value.

Nevada alone, in 1992, produced in excess of 6.5 million troy ounces of gold with a value in excess of $2.3 billion. Directly and indirectly, gold mining in the U.S. employs some 72,000 people. But even these numbers pale in the face of those that describe the scale of the enterprise in physical terms. On an annual basis, gold mining in the Intermountain West moves more than 150 million metric tons of ore and close to two billion total metric tons of earth and rock. And yet, all of the gold produced throughout human history would constitute a cube just 58 feet on a side.

> *"...the production of gold in the United States has seen a 500 percent increase in the last decade alone....Yet, all the gold produced throughout human history would constitute a cube just 58 feet on a side."*

Both economic and technological factors have contributed to what the media has labeled "the new gold rush." Economically, in 1971, a Presidential order ended the convertibility of the U.S. dollar to gold. And in 1972, restrictions on the private ownership of gold by U.S. citizens were eliminated. Responding to free market forces, the value of gold rapidly increased to a record 1980 level of $612 per ounce. This high price sparked investor interest and renewed exploration, particularly in the historic mining districts of the Intermountain West.

On the technical front, both new geologic theory and innovative recovery technologies contributed to the boom. The discovery of widely disseminated low grade deposits of microscopic, or "invisible," gold coupled with a new recovery technique called heap leaching allowed the economic recovery of vast new reserves.

Capitalizing on cyanide's unique ability to dissolve gold, heap leach technology involves the sprinkling of a dilute cyanide solution on vast piles of ore placed on carefully engineered impermeable pads, accumulating the gold laden solution, and recovering the gold from that solution. Most such mines depend upon near surface, open pit reserves, where the ore can be economically excavated using large scale equipment.

Higher grade deposits often support more complicated recovery technology involving the crushing and grinding of the ore followed by leaching in vats or tanks. The higher capital and operating costs for these operations are offset by the more effective recovery of the gold from the higher grade material.

As established mines deepen and their near surface ores, oxidized by centuries of exposure to rain and air are exhausted, many sites encounter gold ores resistant to simple cyanidation. Called refractory ore, these gold containing materials require some form of pretreatment to release the gold particles and to make them accessible for normal recovery. These ores are increasingly being treated in massive pressure cookers, or autoclaves, utilizing technology innovated by Homestake and first applied at the McLaughlin Mine.

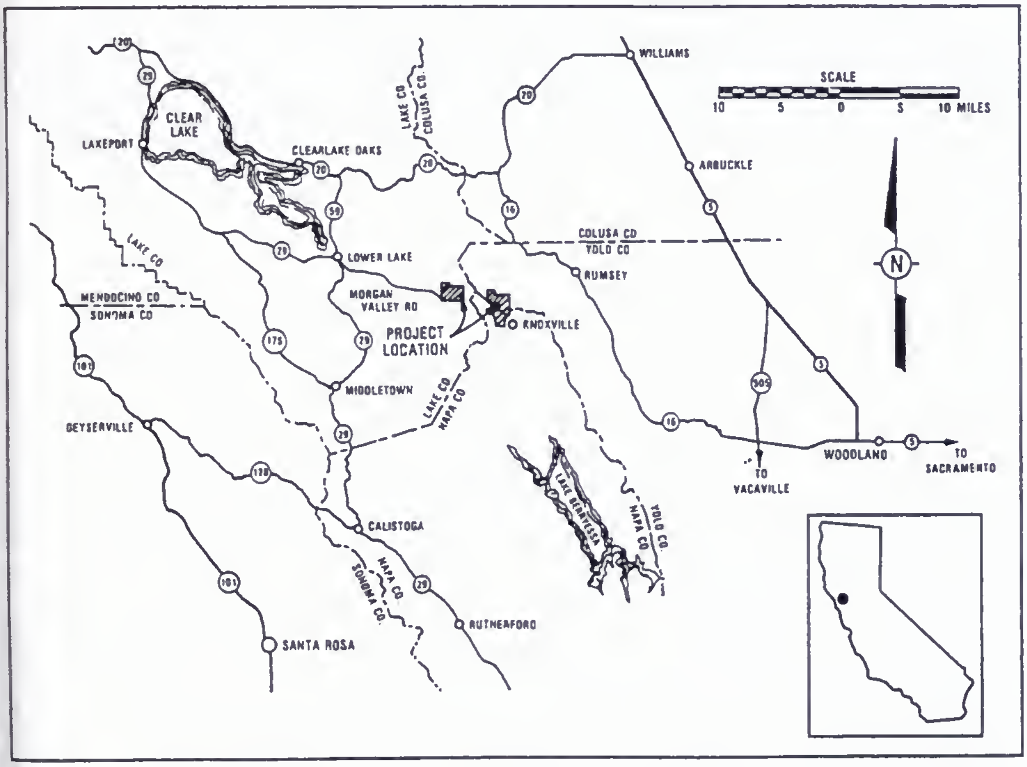

Fig. 2. *Located in the Coast Range some 70 air miles north of San Francisco, the McLaughlin Mine includes facilities in each of three counties and on both private and public lands.*

Mining and the Environment

Along with the relocation of vast quantities of earth and rock and the disruption of vegetation supporting top soils, mining projects often unearth acid producing minerals and various heavy metals capable, if mobilized and discharged, of upsetting downstream ecosystems.

Mining of necessity also impacts the quantity and flow of both surface and ground water in the vicinity of the mine site. The processing of ores can require hundreds of gallons per minute of fresh water. Mine pits must be dewatered in order to allow the excavation of ore, in some cases pumping and discharging thousands of gallons of ground water per minute.

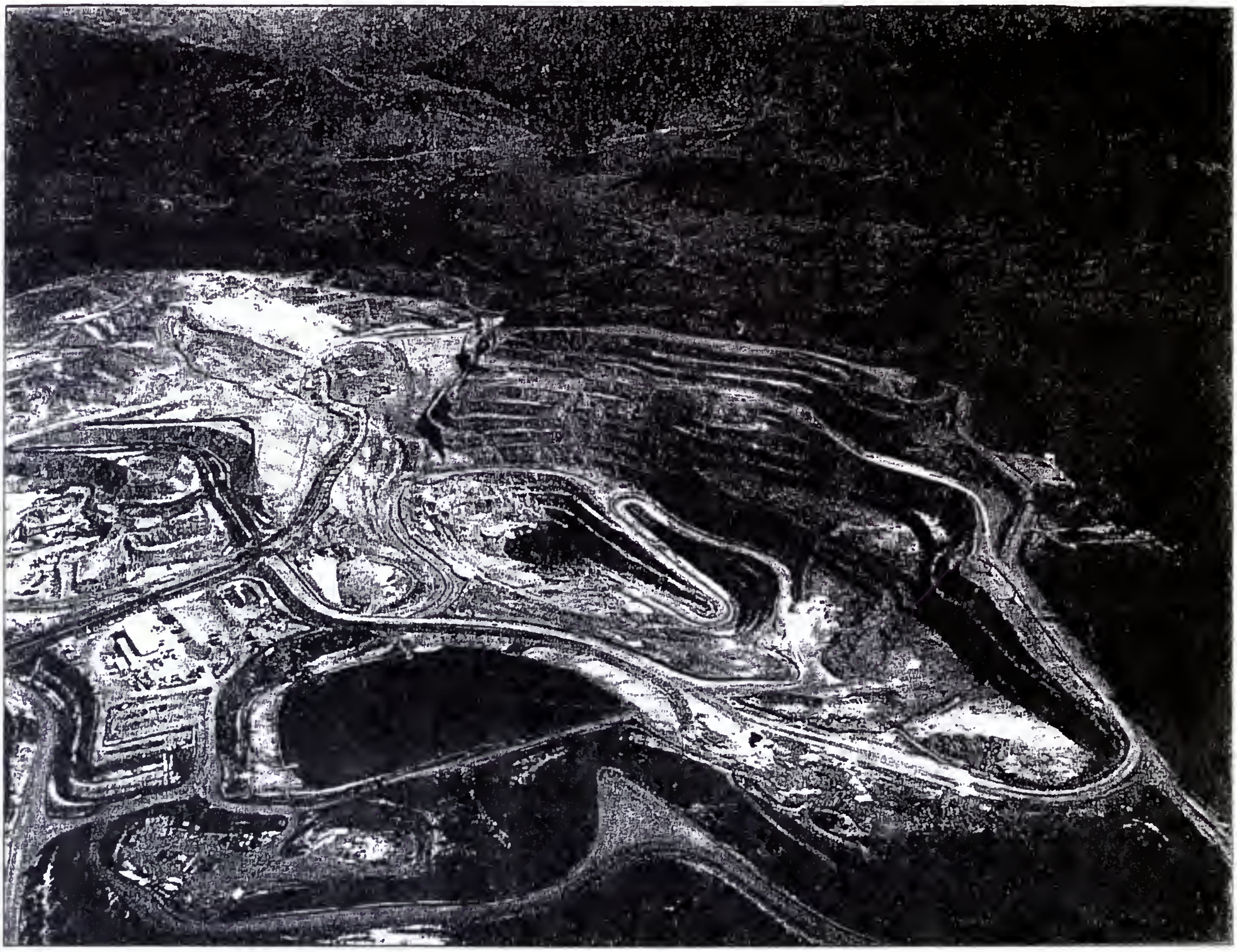

Fig. 3. *The McLaughlin Mine pit will be a mile long, half a mile wide and 1000 feet deep at the conclusion of mining. The north half of the pit will be backfilled and the south half reclaimed as a lake. Photo by Manley-Prim.*

And the flow of surface waters must frequently be rerouted to provide suitable work areas.

Mining, like all large scale land alteration, also impacts vegetative communities and their associated wildlife populations. And, like all earth-moving projects, mining releases dust particles to the air.

The McLaughlin Mine

Wedged between the rocks of the pacific and continental tectonic plates some 70 miles north of San Francisco, where, between two million and 500,000 years ago, a boiling, geysering hydrothermal system deposited almost four million ounces of gold, the McLaughlin Mine was first discovered in 1978 (*Fig. 2*). Confirmed by exploration drilling to be a commercial deposit by 1980, the mine was planned, engineered, permitted, constructed and brought into production by March of 1985.

Employing some 350 people, the mine produced its two millionth ounce in October of 1993. Production will continue well into the next century. Processing over 6000 tons of ore per day, gold production for 1993 is projected to exceed 300,000 ounces at a cash cost of under $200 per ounce. Homestake's capital investment in the project to date exceeds $300 million. With facilities situated in each of three counties and involving both private and Federal lands, the mine required 327 permits before the first gold bar was poured.

In addition to the ore body, or mine pit (*Fig. 3*), the facilities includes a newly constructed fresh water reservoir and a waste rock disposal facility where nongold barring rock is placed and progressively reclaimed. Storage areas where low grade ores are conserved for future processing are also provided. Crushing and grinding plants reduce ore to a muddy water like slurry. A pumping and pipeline system transports the slurry to the process facility where the gold is chemically separated from the rock and recovered. And finally, the rock, less the gold, is deposited in a tailings disposal facility where it will ultimately be covered with topsoil and revegetated.

Hoping to bring the mine into production quickly, Homestake adopted a proactive permitting strategy. Seeking out regulators, neighbors, community members, and potential adversaries, any party who might have had a real or perceived

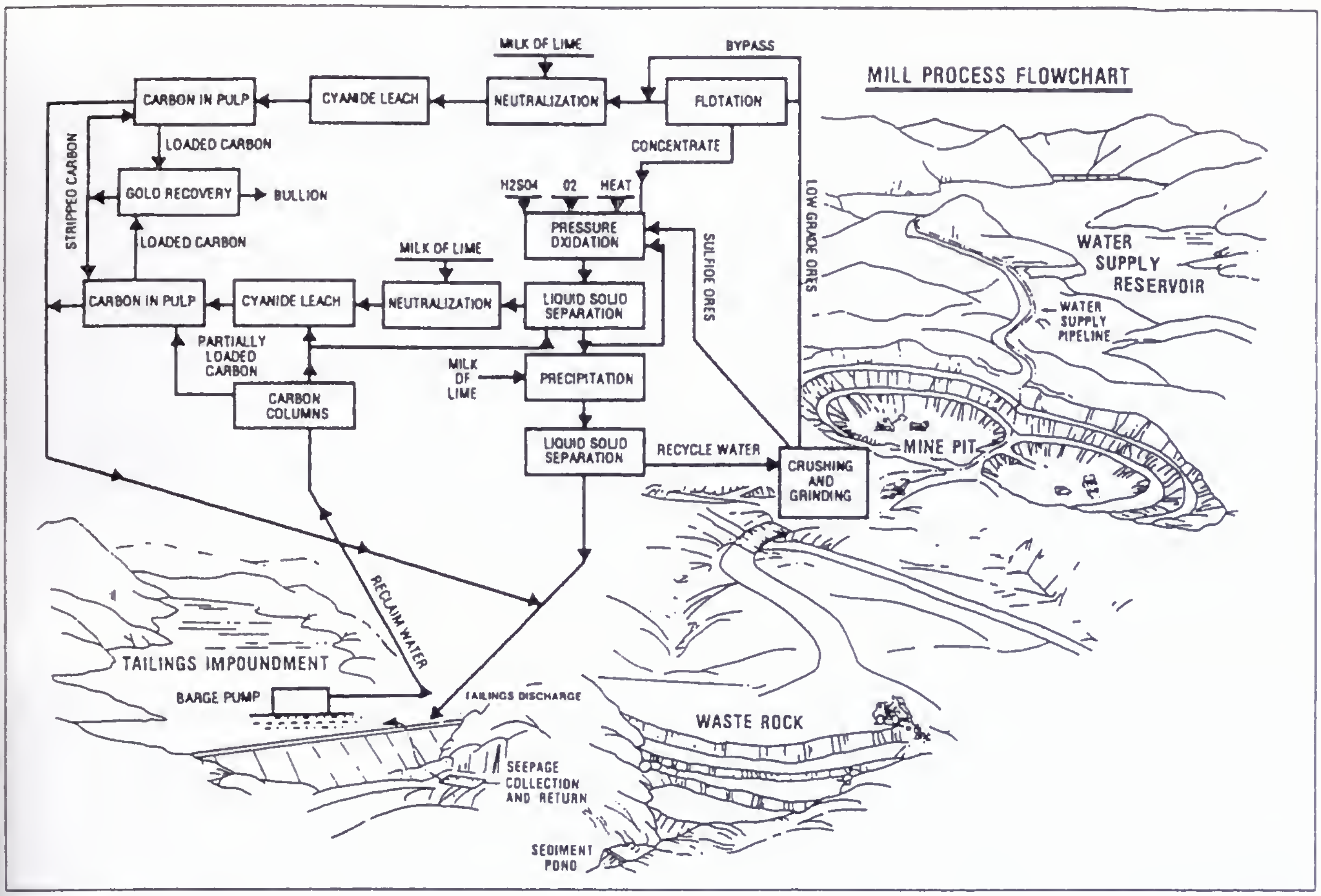

Fig. 4. *Mill Process Flowchart.*

interest at stake was offered the opportunity to participate in the planning of the project.

Environmental baseline studies provided the data necessary to plan and engineer a project configuration that minimizes environmental impacts. The mine's potential to pollute was examined, and pollution prevention features were incorporated into the project design. Reclamation and habitat management plans were prepared.

The company's efforts have been rewarded with both economic and environmental success. Despite the jurisdictional complexity, the formal permitting of the mine was accomplished in eleven months. A comprehensive environmental monitoring program demonstrates that the mine has effectively protected the quality of surrounding ecosystems and even improved downstream water quality. And the productivity of surrounding wildlife habitat has been effectively restored.

Environmental Practices

The McLaughlin environmental approach is fundamentally simple and straight forward. It involves two principles. First, prevent pollution by containing the impacts of the mine to the mine site. And second, reclaim the lands disturbed by mining to a productive second use. In our experience, when these principles are followed, the best environmental practices also prove to be the most cost-effective.

Examples of McLaughlin's pollution prevention features include: 1) the selection of a mineral recovery technology that both maximizes the economic recovery of gold and also minimizes the toxicity of the mine's tailings, 2) the selection of a tailings disposal site with optimal containment characteristics, 3) the siting and design of facilities to provide secondary containment and to allow for the management of storm water and run-off, and 4) the management of waste rock disposal to prevent the formation of acid rock drainage.

Recovery Technology Selection

The geochemistry of ore bodies varies tremendously from site to site. Metallurgical studies are required to determine the feasibility of mineral recovery and to select a preferred mineral recovery technology. These studies can also effectively evaluate the environmental consequences of these technologies.

Despite the risks associated with the use of a new and unproven technology, on the basis of both economic and environmental advantages, Homestake selected pressure oxidation or autoclaving to process the McLaughlin ore (*Fig. 5*). Gold recoveries proved higher with pressure oxidation and capital and operating costs lower. Environmentally, the autoclaves immobilize trace heavy metals, eliminate the potential for acid formation, and reduce the concentration of the residual cyanide in the tailings. Thus, the McLaughlin tailings are nonhazardous according to both state and federal standards and present no threat to water fowl or wildlife.

Tailing Site Selection

Screening studies identified all potential tailings disposal sites within a ten mile radius of the ore body. Fatal flaw analysis and field reconnaissance reduced the original thirty-four sites to three. The selected sites were subject to detailed field investigations.

The tailings disposal site identified by these investigations is ideal. It provides secure containment for the tailings, protecting downstream water quality and preventing the degradation of surrounding groundwater. Because the basin is highly impermeable and not underlain by usable ground water, no synthetic liner was required.

Ongoing monitoring of surrounding ground and surface waters demonstrates that no contaminants have been released from the site. Residual cyanide has remained below a concentration the would be a threat to water fowl and wildlife. From an economic standpoint, the additional capital and operating costs of transporting the ore the five miles to the tailings impoundment are offset by the avoided costs of liner, leachate collection and closure systems and by the enhanced certainty of pollution prevention provide by this site.

Secondary Containment and Storm-water Management

Water quality protection in the vicinity of the McLaughlin Mine pit is maintained by a collection and containment system that intercepts all storm-water flow as well as all water removed from the mine pit. Accumulated water is pumped to the grinding circuit and used as process water. This system also provides back-up containment for fuel, waste oil, and other bulk materials (*Fig. 6*).

> *"In our experience...the best environmental practices also prove to be the most cost effective.."*

Similarly, the McLaughlin extraction plant is engineered to drain to the tailings pond, thus eliminating the discharge of any storm water from that facility to the downstream watershed and providing backup containment for the entire plant and its contents.

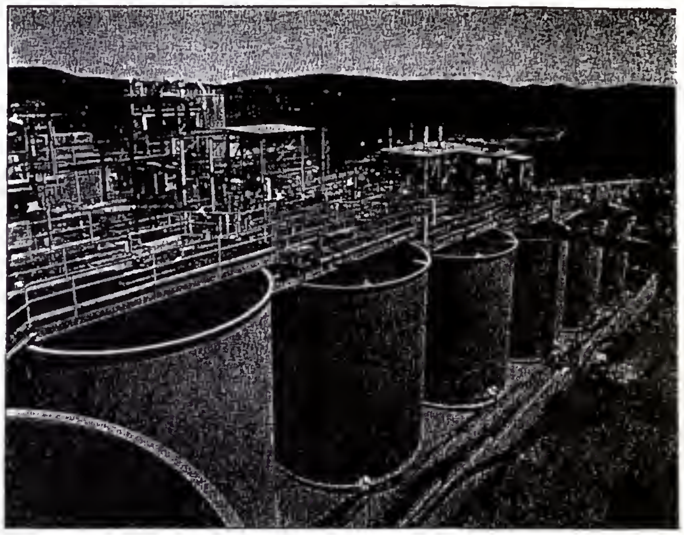

Fig. 6. *Located five miles north of the mine pit, the zero discharge design of the McLaughlin process plant contains all ore and process chemicals in a closed system of tanks, pipes and vessels. Photo by Manley-Prim.*

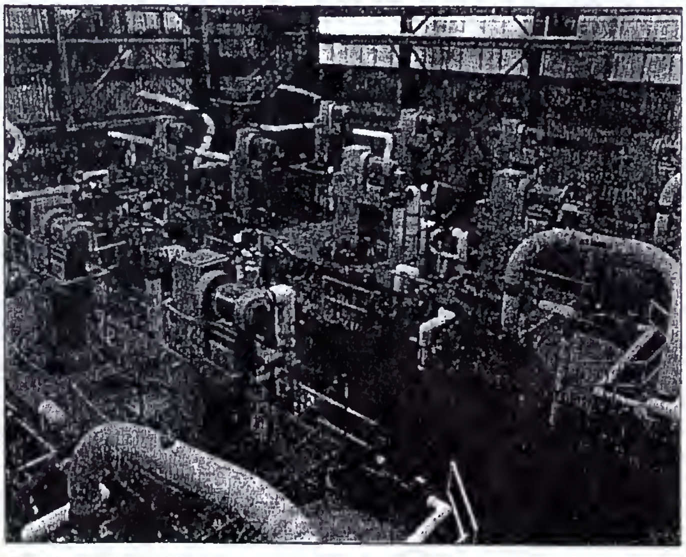

Fig. 5. *McLaughlin's massive autoclaves or pressure vessels oxidize the ore, liberating the gold particles from their sulfide matrix and rendering the tailings non-hazardous. Photo by R. Krauss.*

Ultimately, the operation depends upon the fact that the regional climate provides substantially more evaporation than rainfall. This allows the containment and evaporation of all potentially contaminated waters.

Extensive water quality and aquatic ecology monitoring demonstrates the effectiveness of this zero discharge design at preventing pollution, preserving surrounding ecosystems, and protecting the beneficial uses of downstream waters.

Acid Rock Drainage

The most persistent pollution historically resulting from mining is acid rock drainage. The exposure of sulfide rich minerals to air and water coupled with the occurrence of sulfide oxidizing bacteria, can produce extremely acidic waters which in turn dissolve and mobilize heavy metals.

At McLaughlin, an active program of selective placement of the waste rock was devised that prevents the formation of significant volumes of acid leachate. This program includes the identification of potentially acid-forming waste rock in the pit and its encapsulation within non-acid generating clays in the disposal facility. This isolates the material from air and water which prevents the formation of acid leachate.

Dump under-drains deliver what little leachate is formed to a pump back system which returns the water to the grinding circuit. Storm water run-off from the active dump surfaces is routed through a series of sediment control ponds. Closure and reclamation of each dump lift occurs at the earliest opportunity.

The McLaughlin acid rock drainage management program has effectively minimized this source of potential pollution. Downstream water quality and aquatic ecology remain unchanged from pre-mine conditions.

Water Management

A fresh water reservoir was constructed to provide water to process the McLaughlin ore (*Fig. 7*). A dam on Davis Creek impounds sufficient winter run-off to not only meet the mine's requirements but to also provide significant new wildlife habitat.

Wildlife monitoring reveals extensive use of the new reservoir by both resident and migratory waterfowl. A nearby herd of endangered tule elk have expanded its range to use the reservoir margins. Winter roosting bald eagles are seen daily stalking the waterfowl, and golden eagles have begun to establish a nest nearby. Bear and mountain lion, along with more common predators such as bobcats and coyotes, are frequent visitors. And deer and many small mammals have expanded their numbers.

The Davis Creek Reservoir has also become an important environmental research site. A complete set of limnological data have been systematically collected since the filling of the water body. Initial evaluation of the data found that mercury, occurring naturally in the upstream watershed and associated with historic quicksilver mining, was being incorporated into the reservoir's food chain. Under the direction of Dr. Charles Goldman, graduate students from the University of California, Davis, have conducted cutting edge research on the mechanisms of mercury transport in natural systems (*Fig. 8*).

Reclamation

At the conclusion of mining, the McLaughlin Mine will become an approximately 10,000 acre environmental studies field station. An evaluation of postmining assets reveals that a valuable educational resource will result from the project in the form of accumulated environmental baseline and monitoring data. In addition, the mine's laboratory, offices, shops and other physical improvements will become available for field station use. The station, to be managed by the University of California, will be available for use by regional public schools and colleges as well.

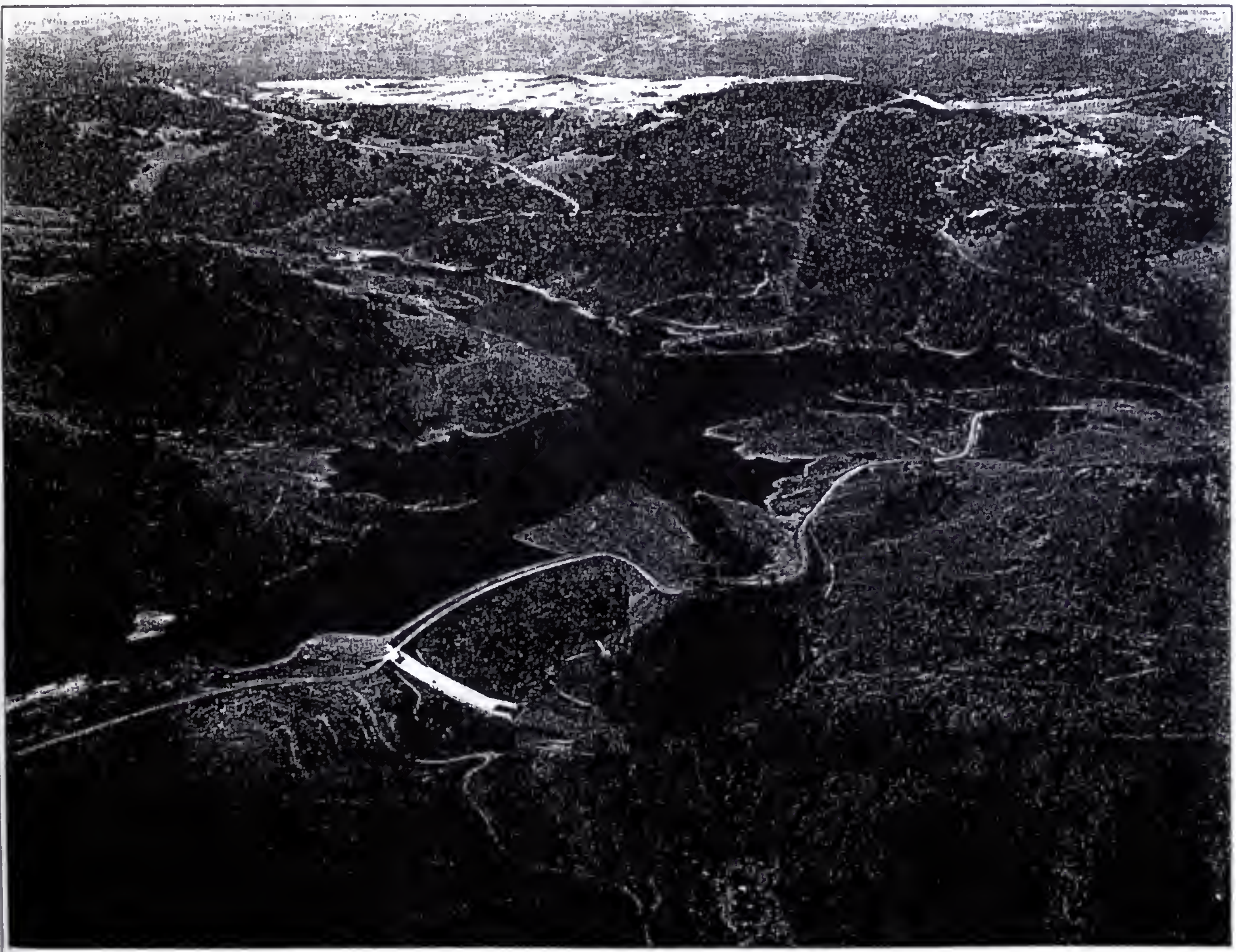

Fig. 7. *Constructed by Homestake, the Davis Creek Reservoir not only supplies fresh water to the mine but also provides habitat for waterfowl, endangered tule elk and wintering bald eagles. Photo by Manley-Prim.*

Fig. 8. *Regular monitoring of the aquatic ecology in the three watersheds downstream of the McLaughlin site demonstrates the effectiveness of the mine's pollution prevention features. Photo by R. Krauss.*

Physical reclamation of the site is designed to minimize erosion and to stabilize disturbed areas with a permanent, diverse, vegetative cover which will support local wildlife populations. Suitable soils from disturbed areas throughout the project have been stockpiled for reclamation use. Priority is assigned to the closure and revegetation of the waste rock and tailings disposal areas. The north half of the mine pit will be backfilled, with the remaining portion reclaimed as a lake or waterbody. The highwall benches will be planted with native trees and shrubs to provide habitat for raptors and other cliff dwellers.

Resoiled areas are hydroseeded using a mix of grasses and clovers naturally occurring in the area. Seeded slopes are mulched with blown straw to protect the seed and prevent erosion until the grasses can become established (*Fig. 9*). Once reclaimed areas have been stabilized, native woody plants are introduced to provide habitat diversity. Reclamation is conducted concurrently with mining, and not deferred to the end of the life of the mine. The reclamation of the site is guaranteed by a $10 million letter of credit payable to the local, state and federal governments.

Habitat Management

The McLaughlin Mine utilizes but a small portion of the lands owned and managed by Homestake. Production of the gold resource makes it possible for the company to restore and enhance the wildlife habitat on over 8500 acres of buffer lands. Contaminants from three abandoned historic mercury mines have been removed and their sites reclaimed. A Contiguous Lands Management Plan provides for the restoration of the property's ecosystems. Perhaps most unique is a program to provide protected roosting habitat for the threatened Townsend's big-eared bat (*Fig. 10*). In short, the mining project provides the opportunity and the economic support for the restoration of an area substantially abused by historic overuse.

Conclusion

McLaughlin style proactive planning and permitting are increasingly becoming standard operating procedures for many of the mining companies operating in the Intermountain West. Benefits of the approach include delay-free permitting and project development, and more environmentally safe and ultimately more economical projects. Pollution prevention designs that contain mine contaminants and reclaim mine disturbance are both feasible and cost-effective.

In the broadest sense, Homestake's McLaughlin Mine demonstrates that society can produce the minerals needed to sustain and advance our civilization in a manner that is both economically and environmentally sound.

Acknowledgments

It has been my great good fortune to work for a company that supports and encourages responsible and enlightened resource management. Homestake Mining Company has demonstrated an unusual willingness to go beyond the letter of the law and beyond the precedent of current environmental practice in the conduct of large scale mining ventures. I am deeply grateful for the support of Homestake's management

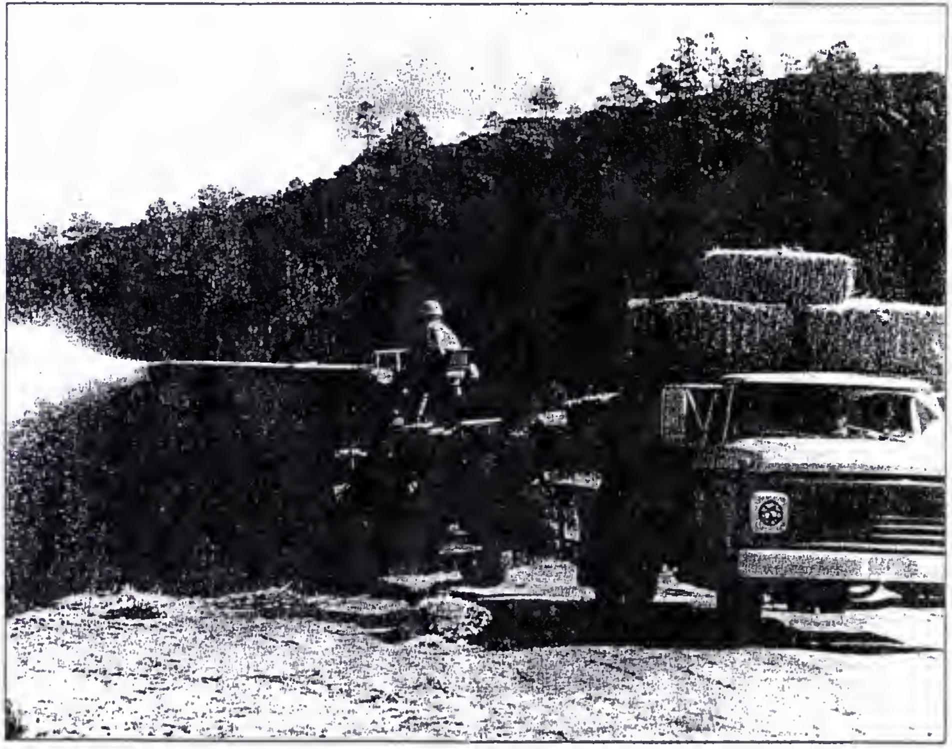

Fig. 9. *Blown straw mulch applied to reclaimed areas conserves moisture improving germination of the grasses and clovers and prevents erosion until the vegetation can become established. Photo by R. Krauss.*

and in particular that of Resident General Managers Jack Thompson and Ron Parker. Environmental Engineers Phil Barnes, Jim Jackson, Dolora Koontz, Sheri Snyder and Tom Milligan have created McLaughlin's environmental programs and, with the clerical help of Georgia McAlister, ensure their daily application. And finally, the 1993 Earle A. Chiles Award recognizes not just a personal achievement, but the achievement of an extraordinary team of scientists, engineers and managers whose individual best efforts combine to make the McLaughlin Mine both an economic and an environmental success. With each person outstanding in his or her discipline, this team of forward thinking, positive, supportive people make each day of work a distinct pleasure, and I am deeply indebted to them. EAC

Fig. 10. *A protected maternity roost for the threatened Townsend's big-eared bat is one component of the McLaughlin Mine's program to restore and enhance the wildlife habitat on over 8,500 acres. Photo by M. Tuttle.*

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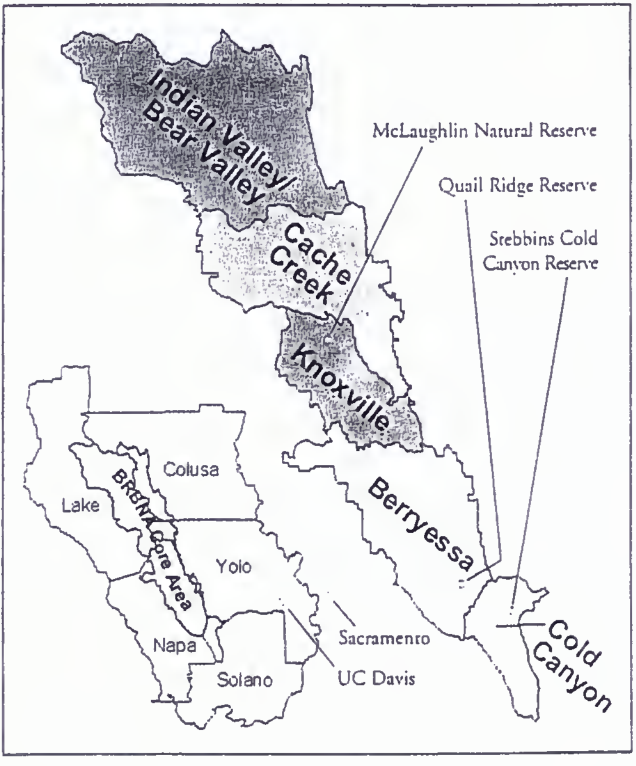
About the Blue Ridge/Berryessa Natural Area Conservation Partnership

The simple maps that appear below show the general boundaries of the loosely defined, 500,000-acre Blue Ridge/Berryessa Natural Area (BRBNA), how it lies within its five participating counties of Solano, Napa, Yolo, Lake, and Colusa, and how it is sectioned into its own five districts. The region, geographically defined by Lake Berryessa and the Blue Ridge, is characterized not only by a wealth of diverse natural attributes, but also by rich historical, cultural, and recreational resources attractive to both local residents and visitors from larger urban communities in the San Francisco Bay Area and Sacramento. A combination of extensive public-land ownership and large private holdings (mostly used for ranching and agriculture) has kept the area significantly undeveloped — and that circumstance now makes regional conservation efforts by the BRBNA partnership all the more practicable. The BRBNA conservation partnership is stepping into a valuable opportunity to affect open-space planning and to reduce unbridled piecemeal development — whether residential, industrial, or recreational — or at least direct it toward other areas already fragmented.



BRBNA Primary Participants

Organized in 1998, the BRBNA membership now consists of over 130 agencies, organizations, and individuals, with approximately 30 to 40 of these actively participating in monthly meetings.

Federal agencies
U.S. Bureau of Land Management
U.S. Bureau of Reclamation

State agencies
CA Coastal Conservancy
CA Department of Fish and Game
CA Department of Parks

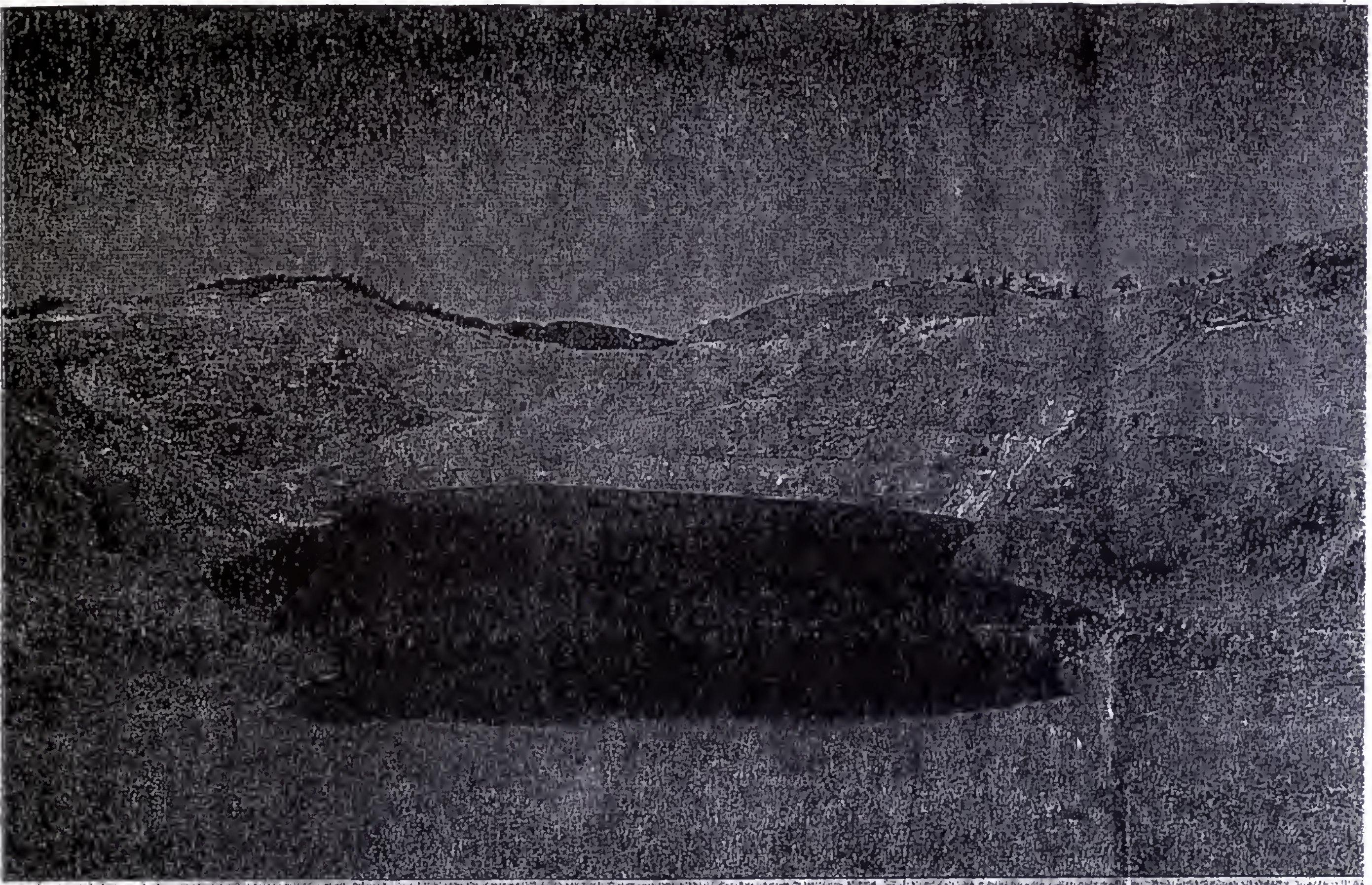
County government
Lake Co. Community Development Dept.
Napa Co. Planning Dept.
Napa Co. Resource Conservation District
Yolo Co. Community Development Dept.

University of California
UC Davis Putah-Cache Bioregion Project
UC Natural Reserve System

Private landowners
Gamble Ranch
Guenoc Ranch
Homestake Mining Company
Livermore Ranch
Morgan Valley Ranch
Todd Ranch

Nonprofit groups
American Land Conservancy
The Conservation Fund
Lake Co. Land Trust
Quail Ridge Wilderness Conservancy
The Land Trust of Napa Co.
The Nature Conservancy
Trust for Public Lands
The Wilderness Coalition
Yolo Co. Land Trust

Nature taking back gold mine



SEAN GALVIN/REGISTER PHOTO

This former pit that is hundreds of feet deep, is naturally filling up with water. The pit belongs to the Homestake Minin Company. The mine is located in eastern Napa County, along the southern edge of Lake County.

End of road for Napa County's mother lode

These 65 ton trucks once hauled 80 to 100 ton loads of dirt from the mine.

By NATHAN CRABBE
Register Staff Writer

The rolling, grassy hills with spots of oak trees at first seem no different than thousands of undeveloped acres in northeast Napa County. Casual observers wouldn't realize the land beneath them once held more than $1 billion worth of gold.

Then a giant crater comes into view — a mile long, hundreds of feet deep and just beginning to fill with water — and it's clear this isn't the Napa of wine-grape growing fame.

The Homestake Mining Company has extracted about 3 million ounces of gold from 38 million tons of rock over the past 1 years in this remote corner c Napa County as well as the southern edge of Lake County and a eastern sliver of Yolo County.

Now, the company is windin down its operations and settin into place the final plan to reve the land to as pristine a state a possible. The plan is scheduled t come before the Napa Count planning commission on Dec. 2

The plan partially involves tak

See END, Page 4

End

From Page 1A

ing rock extracted from the huge mining pit and contouring it into hills that blend with the surrounding area.

First silver and mercury, then gold

Homestake's McLaughlin Mine is reached by taking Berryessa-Knoxville Road about 20 miles past the northern tip of Lake Berryessa.

Dean Enderlin, senior environmental engineer for the mine, said the remoteness of the area led to its unspoiled state, sans the mine, of course.

"It's really like going back into time," Enderlin said.

Mining has occurred in the area since the 1860s, but gold wasn't discovered until more than a century later. Instead, silver and mercury were pulled from the land. Unlike gold mines such as the famed mother lode of the Sierras, the gold deposits in McLaughlin aren't big, shining chunks of the mineral.

Instead, the gold at McLaughlin was in the form of minuscule specks that require a tedious and expensive process to cull. It wasn't until a boom in gold prices and advances in technology that it became profitable to mine the 17,000-acre site.

Homestake has conducted mining operations at McLaughlin since 1985, though the company ceased the actual process of mining in 1996. Since that time, the mine has culled gold from a towering pile of already-excavated rock.

Homestake thought it would find 1 million ounces in gold at the site, but has actually excavated about 3 million ounces to date and expects 3.5 million when it finishes work next year. It's the largest gold discovery of the 20th Century in California.

At the current price of about $270 an ounce, that equates to $945 million worth of gold. But the gold costs $220 an ounce to produce, Enderlin said. And because the mine site cost $285 million to develop before gold was even poured, he said, the operation isn't as profitable as one might expect.

The mine plans to shut down the facility in 2002. Homestake employed 350 people at its peak, but just 93 remain to be affected by the closure.

The land will then be reverted to a more natural state to be used for environmental study in conjunction with the surrounding 300,000-acre Blue Ridge/Berryessa Natural Area. It will in part be used as part of UC Davis' reserve system for use in education and research.

Homestake will retain responsibility for making sure areas in which hazardous waste have been disposed stay safe. Areas with contamination have been tightly monitored by Homestake, and the company will continue to do.

The Land Trust of Napa County will hold a conservation easement to ensure the land isn' subdivided or otherwise commercially developed.

The darker aspect of nature

UC Davis environmental sciences professor Dr. Susan P. Harrison, who directs the campu reserve system, praised th potential for environmental stud in the area.

"It's just amazingly diverse, Harrison said.

Tule elk and mountain lions roam hills and valleys broken up by patches of chaparral, pine and oak trees. Harrison said the variety of plants, soil and wildlife makes it among the most diverse areas in the region and "never fails to amaze" her.

Parts of the land are ideal to study the darker aspects of nature.

A reservoir with elevated levels of mercury will be used to study for the metal's effect on fish. One area ravaged by wildfires will be studied to see how the environment recovers from such an event. Grasses introduced to the area will be studied to see how they choke off native species.

There will likely be no public access to the land so as to not disturb research projects, she said, although some conducted field trips might be allowed.

Those seeking recreational activities can access the sprawling Knoxville recreation area that abuts the property.

Despite the huge mining pit, she said, there are still thousands of acres of land that haven't been disturbed.

But the environmental impacts of mining are great, Harrison said, so the project will be reclamation, not restoration.

"It'll never look as though the mine had never been there," she said.

Cyanide a dangerous reminder of mining operations

County planner Jeff Sharp, sifting through a stack of documents on the closure plan submitted Thursday by Homestake, said the company appears to be meeting the original responsibilities set forth in the plan it originally submitted to the county.

"They're doing a bang-up job up there," Sharp said.

Homestake submits yearly monitoring reports to the county and other governmental agencies on levels of environmental contaminants. The company has always worked with the county when levels are high in certain areas, Sharp said.

All parties agree the area of highest environmental concern is the tailings pond. In the mining process, cyanide is added to rock to extract minerals.

The powder left over, which is now contaminated, must then be disposed. Homestake's methods of doing this involves adding water to the powder, then pumping the slurry into a pond — which is actually located on the Lake County side.

The pond is held back by a dam, the water is held in by clay underneath and a fence prevents most wildlife from getting access. Runoff is controlled by company facilities. In time, the pond will be covered with soil and revegetated.

Sharp said the techniques make the area as safe as possible, though high levels of cyanide will remain.

"It's poison soil only in the sense it's highly concentrated," he said.

He said Homestake uses its Berryessa operations as an example to other sites in terms of its environmental responsibility. The company's restructuring of the land is contrary to the "cut it and leave it" philosophy of some mining operations, he said.

The obvious exception, he said, is the mining pit, but that too will eventually fill — in a million years time.

"But geologic time is what they're working on," he said.

Nathan Crabbe can be reached at 256-2260 or ncrabbe@napanews.com

Yolano Group
Mother Lode Chapter
Sierra Club

Ada Merhoff
P.O. Box 960
Davis, CA 95617
March 6, 1984

Yolo County Planning Commission
292 W. Beamer
Woodland, CA 95695

Members of the Commission:

I represent the Yolano Group of the Sierra Club Mother Lode Chapter. The Sierra Club has a reputation for opposition to projects it believes could adversely impact the environment--dams and reservoirs, power plants, delta water transport, housing development on agricultural land, etc. Within the Mother Lode Chapter there are a number of technical people who review large projects such as the McLaughlin Project, people who worked to write some of the environmental law which will now apply. None of these people or committees advised the Yolano Group (one of the Sierra Club groups affected by the geographical location) to "fight fight fight" with the weight of the club as backup.

Like others, we have been concerned with the questions of ultimate jeopardy to the air and water quality of the region. Thus, we are gratified that some refinements to the monitoring process have been recommended by Brown & Caldwell. We feel that the changes recommended by their review team should be incorporated in the final monitoring documentation and include those set forth in its "Report on Review of Baseline Data Adequacy, Environmental Quality Standards and Enforcement--McLaughlin Project (Feb. 1984)"--the blue book--and those made as a result of the meeting on Monday, March 5th, between Brown & Caldwell and interested public. Our view is that it is in the best interests of Yolo County and its citizens to make sure that as many specifics of careful monitoring as possible be included in the actual wording of the permits. For example, deliberations at the March 5th meeting definitely revealed concern over the status of the reservoir. A plan for direct regulation of that body of water should be built into the permit conditions. We recognize that until the reservoir actually exists it cannot be completely understood, but an acknowledgement of the importance of reservoir management and internal monitoring should be made, and a timetable for at least a brief limnological study and subsequent benthic analysis be set up. We feel that this is of sufficient importance to warrant a formal and binding arrangement involving Homestake Mining, Yolo County, and the State of California, however this may best be arranged. If Yolo County feels specifics of monitoring need further consideration, we hope that permit conditions will be in place so that said permits may be either not renewed or revoked if the conditions are not met.

We are likewise concerned with the meagre aquatic ecology baseline data and would be pleased to see that enlarged; again, this could be handled as a permit condition, as could be the issue of boron.

We in the Yolano Group feel it imperative that the concept of an independent review committee be implemented to monitor results of on-going air and water quality surveillance. We hope that as data are objectively reviewed they become public record in the press that we may all follow progress of the mining activity with assurance of environmental protection.

We would be remiss if we did not publically state our feeling that Homestake Mining Company is to be commended for its willingness to accommodate the particular concerns of the interested public, and for its efforts to establish an environmentally sound mining operation here. Such cooperation from a large mining company is noteworthy and deserves due credit.

Sierra Club is not opposing this project based on factors among which are: quality of the EIR, the semi-remote location, on-going educational and research benefits to the public, and a future fresh water reservoir for Yolo County wildlife. Further, we have just become aware of a proposed Davis Creek Reservoir Cooperative Research Program proposed by Homestake and to be implemented by the University of California. If it were carried out as proposed in the draft outline, such a program would be an opportunity for the gathering of invaluable information which could amplify the data base considerably. We would be very pleased if such a study would actually take place and without delay. Above all is a Sierra Club determination to use federal and state law, the local permit process, and a comprehensive monitoring plan to achieve its goals of environmental protection.

Sincerely,

Ada Merhoff
Ada Merhoff
Yolano Group Conservation Chair

Marilyn Glad
Marilyn Glad
Conservation

3-6-84

D WESTERN MINING IN THE TWENTIETH CENTURY ORAL HISTORY SERIES

PREFACE

The oral history series on Western Mining in the Twentieth Century documents the lives of leaders in mining, metallurgy, geology, education in the earth and materials sciences, mining law, and the pertinent government bodies. The field includes metal, non-metal, and industrial minerals. In its tenth year the series numbers thirty-five volumes completed and others in process.

Mining has changed greatly in this century: in the technology and technical education; in the organization of corporations; in the perception of the national strategic importance of minerals; in the labor movement; and in consideration of health and environmental effects of mining.

The idea of an oral history series to document these developments in twentieth century mining had been on the drawing board of the Regional Oral History Office for more than twenty years. The project finally got underway on January 25, 1986, when Mrs. Willa Baum, Mr. and Mrs. Philip Bradley, Professor and Mrs. Douglas Fuerstenau, Mr. and Mrs. Clifford Heimbucher, Mrs. Donald McLaughlin, and Mr. and Mrs. Langan Swent met at the Swent home to plan the project, and Professor Fuerstenau agreed to serve as Principal Investigator.

An advisory committee was selected which included representatives from the materials science and mineral engineering faculty and a professor of history of science at the University of California at Berkeley; a professor emeritus of history from the California Institute of Technology; and executives of mining companies. Langan Swent delighted in referring to himself as "technical advisor" to the series. He abetted the project from the beginning, directly with his wise counsel and store of information, and indirectly by his patience as the oral histories took more and more of his wife's time and attention. He completed the review of his own oral history transcript when he was in the hospital just before his death in 1992.

As some of the original advisors have died, others have been added to help in selecting interviewees, suggesting research topics, and securing funds.

The project was presented to the San Francisco section of the American Institute of Mining, Metallurgical, and Petroleum Engineers (AIME) on "Old-timers Night," March 10, 1986, when Philip Read Bradley, Jr., was the speaker. This section and the Southern California section of AIME provided initial funding and organizational sponsorship.

The Northern and Southern California sections of the Woman's Auxiliary to the AIME (WAAIME), the California Mining Association, and the Mining and Metallurgical Society of America (MMSA) were early supporters. Later the National Mining Association became a sponsor. The project was significantly advanced by a generous bequest received in November 1997 upon the death of J. Ward Downey, UC Berkeley alumnus and early member of the mining series advisory committee. His own oral history was completed in 1992. Other individual and corporate donors are listed in the volumes. Sponsors to date include nineteen corporations, four foundations, and 113 individuals. The project is ongoing, and funds continue to be sought.

The first five interviewees were all born in 1904 or earlier. Horace Albright, mining lawyer and president of United States Potash Company, was ninety-six years old when interviewed. Although brief, this interview adds another dimension to a man known primarily as a conservationist.

James Boyd was director of the industry division of the military government of Germany after World War II, director of the U.S. Bureau of Mines, dean of the Colorado School of Mines, vice president of Kennecott Copper Corporation, president of Copper Range, and executive director of the National Commission on Materials Policy. He had reviewed the transcript of his lengthy oral history just before his death in November, 1987. In 1990, he was inducted into the National Mining Hall of Fame, Leadville, Colorado.

Philip Bradley, Jr., mining engineer, was a member of the California Mining Board for thirty-two years, most of them as chairman. He also founded the parent organization of the California Mining Association, as well as the Western Governors Mining Advisory Council. His uncle, Frederick Worthen Bradley, who figures in the oral history, was in the first group inducted into the National Mining Hall of Fame in 1988.

Frank McQuiston, metallurgist for the Raw Materials Division of the Atomic Energy Commission and vice president of Newmont Mining Corporation, died before his oral history was complete; thirteen hours of taped interviews with him were supplemented by three hours with his friend and associate, Robert Shoemaker.

Gordon Oakeshott, geologist, was president of the National Association of Geology Teachers and chief of the California Division of Mines and Geology.

These oral histories establish the framework for the series; subsequent oral histories amplify the basic themes. After over thirty individual biographical oral histories were completed, a community oral history was undertaken, documenting the development of the McLaughlin gold mine in the Napa, Yolo, and Lake Counties of California (the historic Knoxville mercury mining district), and the resulting changes in the surrounding communities. This comprises forty-three interviews.

Future researchers will turn to these oral histories to learn how decisions were made which led to changes in mining engineering education, corporate structures, and technology, as well as public policy regarding minerals. In addition, the interviews stimulate the deposit, by interviewees and others, of a number of documents, photographs, memoirs, and other materials related to twentieth century mining in the West. This collection is being added to The Bancroft Library's extensive holdings. A list of completed and in process interviews for the mining series appears at the end of this volume.

The Regional Oral History Office is under the direction of Willa Baum, division head, and under the administrative direction of The Bancroft Library.

Interviews were conducted by Malca Chall and Eleanor Swent.

Willa K. Baum, Division Head
Regional Oral History Office

Eleanor Swent, Project Director
Western Mining in the Twentieth
Century Series

January 1998
Regional Oral History Office
University of California, Berkeley

Western Mining in the Twentieth Century Oral History Series

Interviews Completed, June 2002

Horace Albright, *Mining Lawyer and Executive, U.S. Potash Company, U.S. Borax, 1933-1962*, 1989

Samuel S. Arentz, Jr., *Mining Engineer, Consultant, and Entrepreneur in Nevada and Utah, 1934-1992*, 1993

James Boyd, *Minerals and Critical Materials Management: Military and Government Administrator and Mining Executive, 1941-1987*, 1988

Philip Read Bradley, Jr., *A Mining Engineer in Alaska, Canada, the Western United States, Latin America, and Southeast Asia*, 1988

Catherine C. Campbell, *Ian and Catherine Campbell, Geologists: Teaching, Government Service, Editing*, 1989

William Clark, *Reporting on California's Gold Mines for the State Division of Mines and Geology, 1951-1979*, 1993

John Robert Clarkson, *Building the Clarkson Company, Making Reagent Feeders and Valves for the Mineral Industry, 1935 to 1998*, 1999

Norman Cleaveland, *Dredge Mining for Gold, Malaysian Tin, Diamonds, 1921-1966; Exposing the 1883 Murder of William Raymond Morley*, 1995

William E. Colby, *Reminiscences* (California mining lawyer), 1954

Harry M. Conger, *Mining Career with ASARCO, Kaiser Steel, Consolidation Coal, Homestake, 1955 to 1995: Junior Engineer to Chairman of the Board*, 2001

James T. Curry, Sr., *Metallurgist for Empire Star Mine and Newmont Exploration, 1932-1955; Plant Manager for Calaveras Cement Company, 1956-1975*, 1990

Donald Dickey, *The Oriental Mine, 1938-1991*, 1996

J. Ward Downey, *Mining and Construction Engineer, Industrial Management Consultant, 1936 to the 1990s*, 1992

Warren Fenzi, *Junior Engineer to President, Director of Phelps Dodge, 1937 to 1984*, 1996

Hedley S. "Pete" Fowler, *Mining Engineer in the Americas, India, and Africa, 1933-1983*, 1992

James Mack Gerstley, *Executive, U.S. Borax & Chemical Corporation; Trustee, Pomona College; Civic Leader, San Francisco Asian Art Museum*, 1991

Robert M. Haldeman, *Managing Copper Mines in Chile: Braden, CODELCO, Minerec, Pudahuel; Developing Controlled Bacterial Leaching of Copper from Sulfide Ores; 1941-1993*, 1995

John F. Havard, *Mining Engineer and Executive, 1935-1981*, 1992

Wayne Hazen, *Plutonium Technology Applied to Mineral Processing; Solvent Extraction; Building Hazen Research; 1940-1993*, 1995

George Heikes, *Mining Geologist on Four Continents, 1924-1974*, 1992

Helen R. Henshaw, *Recollections of Life with Paul Henshaw: Latin America, Homestake Mining Company*, 1988

Homestake Mine Workers, Lead, South Dakota, 1929-1993, interviews with Clarence Kravig, Wayne Harford, and Kenneth Kinghorn, 1995

Lewis L. Huelsdonk, *Manager of Gold and Chrome Mines, Spokesman for Gold Mining, 1935-1974*, 1988

William Humphrey, *Mining Operations and Engineering Executive for Anaconda, Newmont, Homestake, 1950 to 1995*, 1996

Hugh C. Ingle, Jr., *Independent Small Mines Operator, 1948 to 1999; Corona Mine*, 2000

James Jensen, *Chemical and Metallurgical Process Engineer: Making Deuterium, Extracting Salines and Base and Heavy Metals, 1938-1990s*, 1993

Arthur I. Johnson, *Mining and Metallurgical Engineer in the Black Hills: Pegmatites and Rare Minerals, 1922 to the 1990s*, 1990

G. Frank Joklik, *Exploration Geologist, Developer of Mt. Newman, President and CEO of Kennecott, 1949-1996; Chairman, Salt Lake 2002 Olympic Winter Games Committee*, 1997

Evan Just, *Geologist: Engineering and Mining Journal, Marshall Plan, Cyprus Mines Corporation, and Stanford University, 1922-1980*, 1989

Robert Kendall, *Mining Borax, Shaft-Freezing in Potash Mines, U.S. Borax, Inc., 1954-1988*, 1994

The Knoxville Mining District, The McLaughlin Gold Mine, Northern California, Volume I, 1998
Anderson, James, "Homestake Vice President-Exploration"
Baker, Will, "Citizen Activist, Yolo County"
Birdsey, Norman, "Metallurgical Technician, McLaughlin Process Plant"
Bledsoe, Brice, "Director, Solano Irrigation District"

The Knoxville Mining District, The McLaughlin Gold Mine, Northern California, Volume II, 1998
Cerar, Anthony, "Mercury Miner, 1935-1995"
Ceteras, John, "Organic Farmer, Yolo County"
Conger, Harry, "President, Chairman, and CEO, Homestake Mining Company, 1977 to 1994"
Corley, John Jay, "Chairman, Napa County Planning Commission, 1981 to 1985"
Cornelison, William, "Superintendent of Schools, Lake County" (Includes an interview with John A. Drummond, Lake County Schools Attorney)

The Knoxville Mining District, The McLaughlin Gold Mine, Northern California, Volume III, 1998
Crouch, David, "Homestake Corporate Manager-Environmental Affairs"
Enderlin, Elmer, "Miner in Fifty-Eight Mines"
Fuller, Claire, "Fuller's Superette Market, Lower Lake"
Goldstein, Dennis, "Homestake Corporate Lawyer"
Guinivere, Rex, "Homestake Vice President-Engineering"

The Knoxville Mining District, The McLaughlin Gold Mine, Northern California, Volume IV, 1998
Gustafson, Donald, "Homestake Exploration Geologist, 1975-1990"
Hanchett, Bonny Jean, "Owner and Editor, Clearlake *Observer*, 1955-1986"
Hickey, James, "Director of Conservation, Development, and Planning for Napa County, 1970 to 1990"
Jago, Irene, "The Jagos of Jago Bay, Clear Lake"
Jonas, James, "Lake County Fuel Distributor"
Koontz, Dolora, "Environmental Engineer, McLaughlin Mine, 1988-1995"

The Knoxville Mining District, The McLaughlin Gold Mine, Northern California, Volume V, 1998
Kritikos, William, "Operator, Oat Hill Mine"
Landman, John, "Rancher, Morgan Valley"
Lyons, Roberta, "Journalist and Environmentalist"
Madsen, Roger, "Homestake Mechanical Engineer"
Magoon, Beverly, "Merchant and Craft Instructor, Lower Lake"
McGinnis, Edward, "Worker at the Reed Mine"

The Knoxville Mining District, The McLaughlin Gold Mine, Northern California, Volume VI, 1999
- Robert McKenzie, "McKenzies in Monticello, Berryessa Valley
- Harold Moskowite, "Napa County Supervisor"
- Marion Onstad, "Neighbor and Employee of the McLaughlin Mine, 1980-1995"
- Ronald Parker, "Resident Manager of the McLaughlin Mine, 1988-1994"
- Richard Stoehr, "Homestake Engineer and Geologist to Senior Vice-President and Director"
- Joseph Strapko, "Exploration Geologist, McLaughlin Mine Discovery, 1978"

The Knoxville Mining District, The McLaughlin Gold Mine, Northern California, Volume VII, 2000
- Jack Thompson, "General Manager, McLaughlin Mine, 1981-1988"
- Twyla Thompson, "County Supervisor, Yolo County, 1975-1985"
- Avery Tindell, "Capay Valley Environmentalist"
- John Turney, "McLaughlin Metallurgist: Pioneering Autoclaving for Gold"
- Della Underwood, "Knoxville Rancher, McLaughlin Mine Surveyor"
- Walter Wilcox, "County Supervisor, Lake County, 1979-1995"
- Peter Scribner, "Boyhood at the Knoxville Mine, 1941-1944"

The Knoxville Mining District, The McLaughlin Gold Mine, Northern California, Volume VIII, 2002
- Dean Enderlin, "Mine Geologist, Reclamation Manager, McLaughlin Mine"
- Susan Harrison, "McLaughlin Natural Reserve"
- Raymond Krauss, "Environmental Manager, McLaughlin Mine"

Marian Lane, *Mine Doctor's Wife in Mexico During the 1920s*, 1996

John Sealy Livermore, *Prospector, Geologist, Public Resource Advocate: Carlin Mine Discovery, 1961; Nevada Gold Rush, 1970s*, 2000

J. David Lowell, *Using Applied Geology to Discover Large Copper and Gold Mines in Arizona, Chile, and Peru*, 1999

Plato Malozemoff, *A Life in Mining: Siberia to Chairman of Newmont Mining Corporation, 1909-1985*, 1990

Donald H. McLaughlin, *Careers in Mining Geology and Management, University Governance and Teaching*, 1975

James and Malcolm McPherson, *Brothers in Mining*, 1992

Frank Woods McQuiston, Jr., *Metallurgist for Newmont Mining Corporation and U.S. Atomic Energy Commission, 1934-1982*, 1989

Gordon B. Oakeshott, *The California Division of Mines and Geology, 1948-1974*, 1988

James H. Orr, *An Entrepreneur in Mining in North and South America, 1930s to 1990s*, 1995

Vincent D. Perry, *A Half Century as Mining and Exploration Geologist with the Anaconda Company*, 1991

Patrick Purtell, *Maintenance and Management at the McLaughlin Mine, 1985 to 1997*, 1999

Carl Randolph, *Research Manager to President, U.S. Borax & Chemical Corporation, 1957-1986*, 1992

John Reed, *Pioneer in Applied Rock Mechanics, Braden Mine, Chile, 1944-1950; St. Joseph Lead Company, 1955-1960; Colorado School of Mines, 1960-1972*, 1993

Joseph Rosenblatt, *EIMCO, Pioneer in Underground Mining Machinery and Process Equipment, 1926-1963*, 1992

Robert Shoemaker, *Metallurgical Engineer: Union Carbide, Bechtel, San Francisco Mining Associates; Metallurgical Consultant, 1953 to 2000*, 2001

Eugene David Smith, *Working on the Twenty-Mule Team: Laborer to Vice President, U.S. Borax & Chemical Corporation, 1941-1989*, 1993

Simon Strauss, *Market Analyst for Non-ferrous Metals and Non-metallic Minerals, Journalist, Mining Corporation Executive, 1927-1994*, 1995

Langan W. Swent, *Working for Safety and Health in Underground Mines: San Luis and Homestake Mining Companies, 1946-1988*, 1995

James V. Thompson, *Mining and Metallurgical Engineer: the Philippine Islands; Dorr, Humphreys, Kaiser Engineers Companies; 1940-1990s*, 1992

William Wilder, *Owner of One Shot Mining Company: Manhattan Mercury Mine, 1965-1981*, 1996

Alexander M. Wilson, *Leading a Changing Utah Construction and Mining Company: Utah International, GE-Utah, BHP-Utah, 1954 to 1987*, 2000

Interviews In Process

Frank Aplan, metallurgist
Douglas Fuerstenau, metallurgist
Guy Harris, Dow/mining chemicals
Milton Ward, mining executive

The Regional Oral History Office
would like to express its thanks to the organizations
and individuals whose encouragement and support have made possible
The Western Mining in the Twentieth Century Series.

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